

MARCH 7, 1946

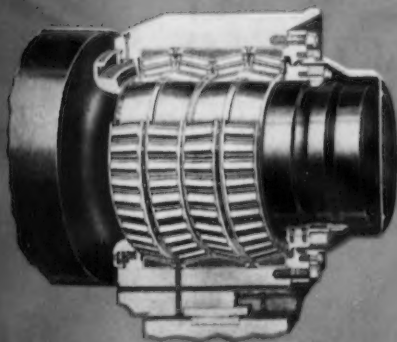
THE

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IRON AGE

roll neck
roll call
for 1945

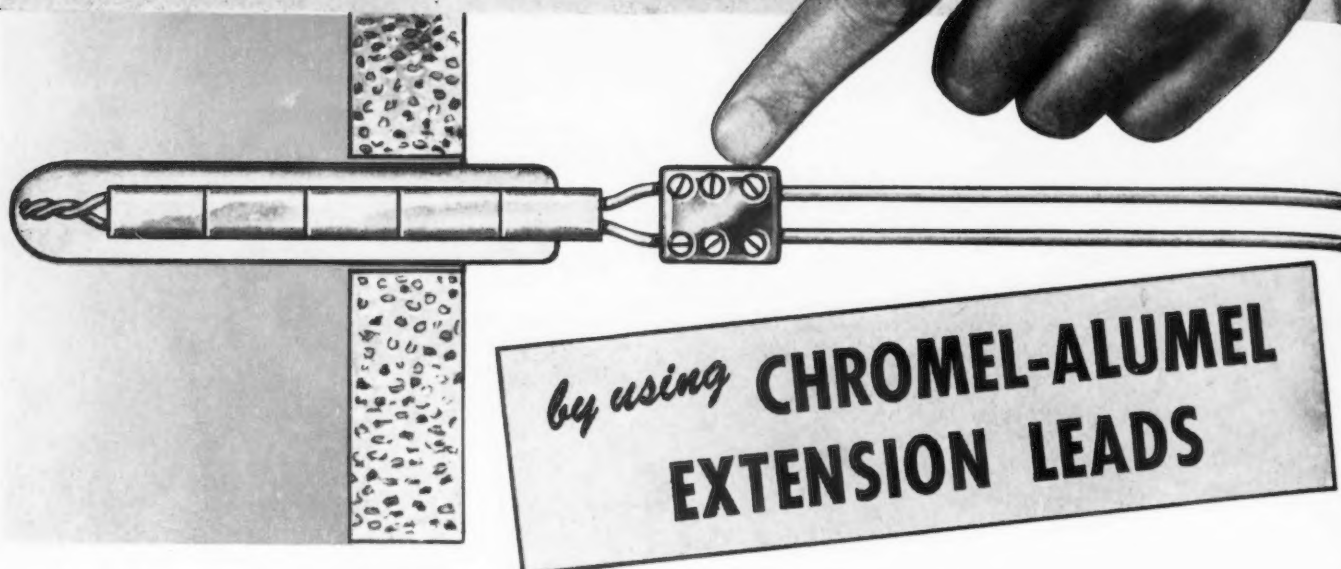
Here is a list of new rolling mills installed from January 1 to December 1, 1945 with Timken Roll Neck Bearings on back-up rolls, work rolls or both. It is proof of the continued popularity of and preference for Timken Roll Neck Bearings resulting from more than 20 years of engineering and metallurgical development. There is no substitute for experience. The Timken Roller Bearing Company, Canton 6, Ohio.



MILL TYPE	MILL SIZE	NO. STANDS	BACK-UP ROLLS	WORK ROLLS
2-high tube mill	28	7		10 1/4 x 17 1/2 x 7 3/4
2-high cold	7 x 6	3		5 x 7-3/16 x 6 1/4
2-high cold	18 x 18	1		11-13/16 x 16 5/8 x 12 1/4
2-high cold	28 x 56	1		19 1/4 x 26 x 14 3/8
2-high cold	8 x 10	1		5 x 7-3/16 x 6 1/4
2-high hot	11 to 15	9		6 x 10 x 4 3/4
2-high cold	28 x 66	1		19 1/4 x 26 x 14 3/8
2-high cold	9 x 9	1		5 x 7-3/16 x 6 1/4
3-high cold	6 3/4 x 13 1/4 x 32	1	Plain	3-3/16 x 5 3/8 x 5
3-high hot	20 x 54	1	11 3/8 x 16 x 11 3/4—all rolls	
3-high hot	20 x 60	1	11 3/8 x 16 x 11 3/4—all rolls	
3-high cold	8 x 14 x 42	2	Plain	5 3/8 x 8 1/2 x 4 7/8
4-high cold	10 1/2 x 23 1/4 x 60	1	15 1/8 x 21 1/2 x 15 3/4	6 1/2 x 8 7/8 x 6 3/8
4-high cold	9 and 21 x 34	2	13 3/8 x 19 1/4 x 14 1/8	5 1/8 x 7 3/4 x 7 7/8
4-high cold	9 and 21 x 34	2		5 1/8 x 7 3/4 x 7 7/8
4-high cold	9 and 21 x 34	7	13 3/8 x 19 1/4 x 14 1/8	5 3/8 x 8 7/8 x 4 3/4
4-high cold	9 and 18 x 36	1		5 x 7-3/16 x 6 1/4
4-high cold	20 and 49 x 54	5		11 x 15 1/2 x 10 5/8 Thrust Bearings
4-high cold	6 x 18 x 18	1	11-13/16 x 16 5/8 x 12 1/4	3.3 x 5 3/8 x 3
4-high cold	6 1/2 x 16 x 12	1	10 x 14 1/8 x 10 5/8	3-1/16 x 5 1/2 x 3-3/16
4-high cold	12 1/2 x 27 x 32	1		7 x 9 3/4 x 7-9/16
4-high cold	8 1/2 x 27 x 32	1		5 x 7-3/16 x 6 1/4
4-high cold	7 x 18 x 32	1	11 1/2 x 16 5/8 x 10 5/8	3 5/8 x 5 3/8 x 5
4-high cold	12 x 32 3/4 x 48	1	20-7/16 x 29 x 21 1/8	8 1/8 x 11 1/8 x 7 1/2
4-high cold	20 and 49 x 56	5		11 x 15 1/2 x 10 5/8 Thrust Bearings
4-high cold	2 1/2 and 5 1/8 x 17 and 18 1/2 x 20	1	11-13/16 x 16 5/8 x 12 1/4 10 5/8 x 15 x 11 1/8	
4-high cold	11 x 36 x 28	1	21 1/8 x 29.995 x 22	6 1/2 x 8 7/8 x 6 3/8
4-high cold	6 1/2 x 20 x 20	1	11-13/16 x 16 5/8 x 12 1/4	3.31 x 5 3/8 x 3
4-high cold	11 x 29 x 30	1	16 x 23 1/4 x 15 3/4	5 1/8 x 7 3/4 x 8 7/8
4-high hot	16 1/2 x 38 x 48	2		9 1/2 x 13 3/4 x 9
4-high hot	18 x 38 x 48	1		10 3/8 x 15 1/2 x 10 5/8
4-high cold	14 x 30 x 30	2		9 1/2 x 13 3/4 x 9
4-high cold	3 1/4 x 9 x 8	4	4 1/2 x 8 3/8 x 6	Plain
4-high cold	21 x 53 x 54	5		13 1/2 x 18 x 10
4-high cold	10 1/4 x 28 x 32	1		6 1/2 x 8 7/8 x 6 3/8
4-high cold	21 1/4 x 53 x 55	5		13 1/2 x 18 x 10
4-high cold	18 x 49 x 42	2		10 7/8 x 15 1/2 x 10 5/8
4-high cold	21 and 49 x 60	1		13 1/2 x 18 x 10
4-high cold	10 1/2 x 23 1/4 x 60	1	15 1/8 x 21 1/2 x 15 3/4	6 1/2 x 8 7/8 x 6 1/2
4-high cold	10 1/2 x 23 1/4 x 60	1		6 1/2 x 8 7/8 x 6 3/8
4-high cold	10 1/4 x 28 x 32	1		6 1/2 x 8 7/8 x 6 3/8
4-high cold	20 and 48 x 56	5		Thrust Bearings

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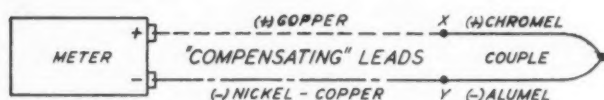


DIAGRAM A

When these junctions get very hot—as they often do—or when one gets hotter than the other, the opposing E. M. F.'s generated become more and more unequal. Thus, the "compensating" leads fail to compensate and a serious plus or minus

error is registered by your pyrometer.

By using Chromel-Alumel Leads with your Chromel-Alumel Couples, you completely eliminate this source of error.

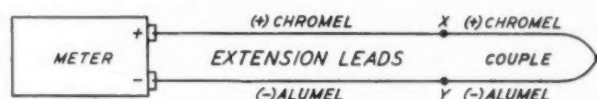


DIAGRAM B

Here the Leads serve merely as extensions of the Couple because both are of the same controlled composition, and where they join, no E. M. F. develops.

Remember, wherever accurate temperature control is vital to your furnace operations, use Chromel-Alumel Extension Leads with Chromel-Alumel Thermocouples. "They belong together!", as explained in our folder of that title. Send for it.



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Community of Interest

IN America, as in all democratic countries, the family is the social unit; the community the economic unit. The welfare of the nation is expressed by integrating the state of being of the tens of thousands of our communities from coast to coast and from border to border. If they are prosperous, then the nation is prosperous. If they are depressed, then prosperity for the nation vanishes around the corner.

If you agree with me on this point, and I think you will, perhaps you will go with me a step further and admit that the community should be the focal point of our economic research into a better America.

Science in any of its many divisions does not advance by the study of whole things but by research into the parts of things. Physicists could have spent their lifetimes in observing a ton or a cubic foot of uranium but until they broke it down into its atoms and then split the atom we should not have had opened the door to atomic power.

The community is the nation's economic atom. Our high-powered economists and legislators are using the wrong method, it seems to me, when they concentrate their studies on the nation as a whole instead of examining its atoms under the high power microscope. Find out what makes a single typical community tick and then plan to make it tick faster and you will have the formula for national prosperity.

What is a typical community in America? Not New York, or Chicago or San Francisco. They are too big. Not Flint, Mich., nor Brockton, Mass. They are too specialized. The typical American community is one in which there is a well-balanced representation of manufacturing, of agriculture and of trade and services. And one which is not too large to obscure the interrelationships and interdependence of these economic segments.

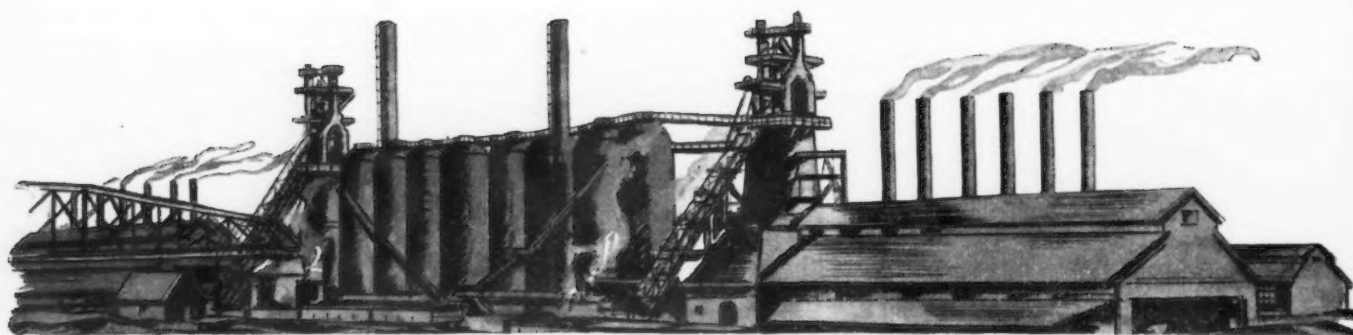
Recognition of the interdependence is especially important. There is no such thing as one-sided prosperity. Wage earners in industry and trade, employers in manufacturing and business, farmers, doctors, dentists and public servants are all entitled to a fair share of it.

Productivity on farm and in factory, with high level employment is the basis of a prosperous community. When you have these you have prosperous tradesmen in the community; doctors' bills are paid when due and the community "ticks".

Paul Hoffman, head of the Committee for Economic Development, recognized the necessity of splitting the economic atom. This group concentrated on communities, organized them throughout the length and breadth of America to plan for postwar high level employment. And it is primarily because of more than three years of this far-sighted and patriotic effort that in spite of our disturbed conditions today, present unemployment is but a quarter of that predicted by our government authorities.

Let's have more of this economic atom splitting. We shall find a new and tremendous source of national power in it.





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INLAND STEEL COMPANY

► Loss of its wartime market has not reacted as severely on the aircraft industry as had been anticipated. Domestic and foreign commercial transport backlogs run into hundreds of millions of dollars and most big producers are now implementing plans to expand into other industrial fields.

► Use of a carbon insoluble anode has made it practicable to deposit heavy nickel from the plating solution inside steel tubing to obtain the benefits of nickel cladding at lower cost.

► A permanent magnet metal called Vicalloy can be machined as cast and rolled to thin sheet and drawn to fine wire. Magnetic properties of high value are obtained by a simple heat treatment. The alloy contains 35 pct iron, 52 pct cobalt and 13 pct vanadium.

► All of Britain will be shifted to a standard electricity voltage of 240. According to the Electricity Commissioners, about 80 pct of the country is already on 240 v.

► The open end immersion pyrometer overcomes many of the disadvantages of the more popular thermocouple and radiation measuring devices. Unlike the thermocouple, no part of the pyrometer attains the temperature of the steel, thus simplifying the design.

Temperature readings are those of the steel and not the slag surface or backwall of the furnace as may be the case with thermocouples or optical pyrometers.

► Hard-bronze bearings can be made by powder metallurgical methods by means of a silicide-hardened copper compact.

Nickel silicide is the hardening agent and, upon heat treatment and quench, much of the free nickel silicide is diffused into solid solution. Aging causes submicroscopic precipitation of this hardening agent within the grains.

► Steels made from electrolytic iron and graphite powders can be treated for yield strengths and tensile strengths reasonably close to those of plain carbon steels. In the higher carbon ranges, values for sintered steels deviate from those of conventional steels.

► Oxyacetylene pressure-welding produces atomic bonding across the weld interface at subfusion temperature. Joints made by this method show no line at the weld and the grain pattern is complete and interlocks across the weld plane, resulting in 100 pct joint efficiency.

The absence of weld metal produces substantial weight saving and joints so welded respond to heat treatment in the same manner as the parent metal.

► Swedish experience with the use of iron ore sinter in blast furnace charges lower fuel consumption in blister steel blast furnaces, increase production per furnace unit and permit use of low grade ores.

For use in charcoal blister steel blast furnaces, sinter must have high iron content; low sulfur and arsenic content; high degree of oxidation and uniform composition.

► Precision-casting producers are meeting with encouraging results in the development of new investment binders. Economy and better control of investment characteristics is the goal.

► Cries of "waste" at home have stalled all dumping of unsalvageable material in the Pacific theatre.

On Leyte there are thousands of truck rear ends, rusty motors, truck frames, broken jeeps and the like, but no one in authority has courage enough to have them dumped in the blue Pacific where they belong. Not worth shipping home for scrap, the only other alternative would be shipment to Japan's steel mills!

► Steep Rock mines in Canada plans to ship 1,000,000 tons of ore in 1946.



Uniwelding Produces High Joint

OXYACETYLENE pressure welding differs from all other gas welding processes in that the weld is made, not at liquid or fusion temperatures, but by atomic bonding across the weld interface at subfusion temperature, under the influence of controlled temperature and pressure. The weld is accomplished by abutting the faces of the two sections to be welded under a specific pressure, and under heat ap-

plied by means of a multiple flame head directing the heat at the weld plane until upsetting occurs.¹

The application of this method of pressure welding to the manufacture of aircraft landing gears has consistently resulted in joints of 100 pct strength in bending, and while these may be made over a wide variety of carbon and alloy steels, experimental work at Menasco has been concentrated on medium carbon, low

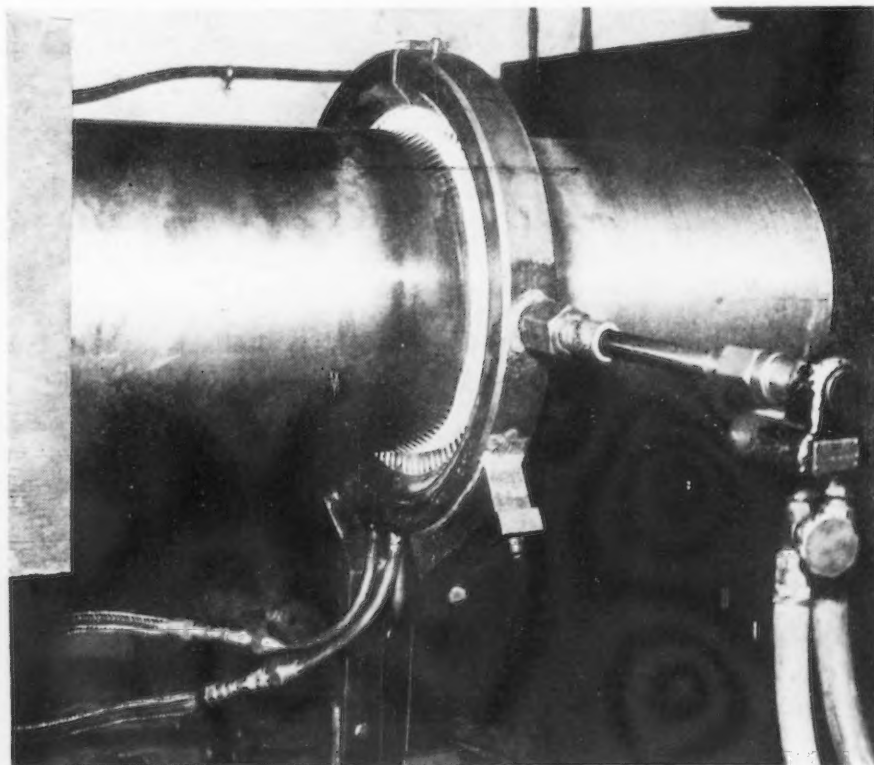
alloy steels customarily used in the manufacture of landing gear. The process has been found ideal for the purpose because consistently high quality welds can be obtained. Manufacturing procedures are simplified because parts that are sometimes impossible to forge as one unit may be broken down into simple forgings, and the preliminary machine work done on these small components. Parts are then welded into one unit possessing physical properties equal to an equivalent part made from one piece.

¹ For first announcement of this process, see *THE IRON AGE*, Sept 23, 1943.

The method used to control the quality of the weld is of great importance, as proper control dictates the consistency and quality of the welds produced. To understand the control methods, it is necessary to understand the entire welding process.

In the commercial application of the process, the ends to be welded are machined to a smooth, clean surface. For the average low-car-

FIG. 2—Closeup of heating head in operation. Oxygen and acetylene leads are shown at right; water connections at lower left.



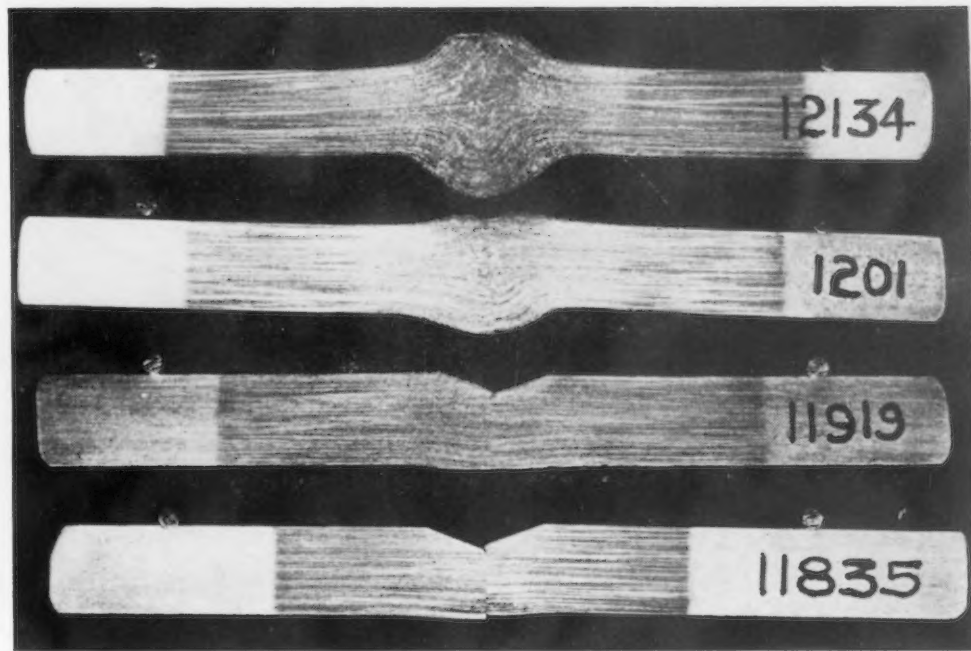
LEFT

FIG. 1—Sixteen-inch Uni-weld machine capable of welding sections of 100 sq in area, or a maximum diameter of 20 in.

o o o

RIGHT

FIG. 3—Cross sections showing the progress of a weld in a 1/4-in. wall specimen.



o o o

By E. R. PROCTOR

Development Engineer, Menasco Mfg. Co., Burbank, Calif.

o o o

Efficiency

bon steel, the principal requirement is cleanliness. The opposing pieces are lined up carefully, after which hydraulic pressure is applied to their ends. The blow pipe, or heating head, is lighted and adjusted to predetermined gas pressures. When the metal has reached approximately the welding temperature, the metal parts start to upset gradually. The process continues with the temperature gradually increasing, during which time a predetermined degree of upset is produced. The flames are then extinguished and the hydraulic pressure released.

During 1941, the major aircraft manufacturing companies were carrying on experimental and research work in the application of butt welding to the manufacture of landing gears, in order that a considerable reduction in weight might be achieved. To expedite this program, the major landing gear manufacturers were requested to apply their facilities to the problem.

Some of the first pressure welds made by the Hydril Corp. of Los Angeles were examined and tested by the Menasco Mfg. Co. The results indicated that the process had possibilities in advancing the art of landing gear design, and would improve the manufacturing methods used. Consequently, a research and development program was instituted by Menasco.

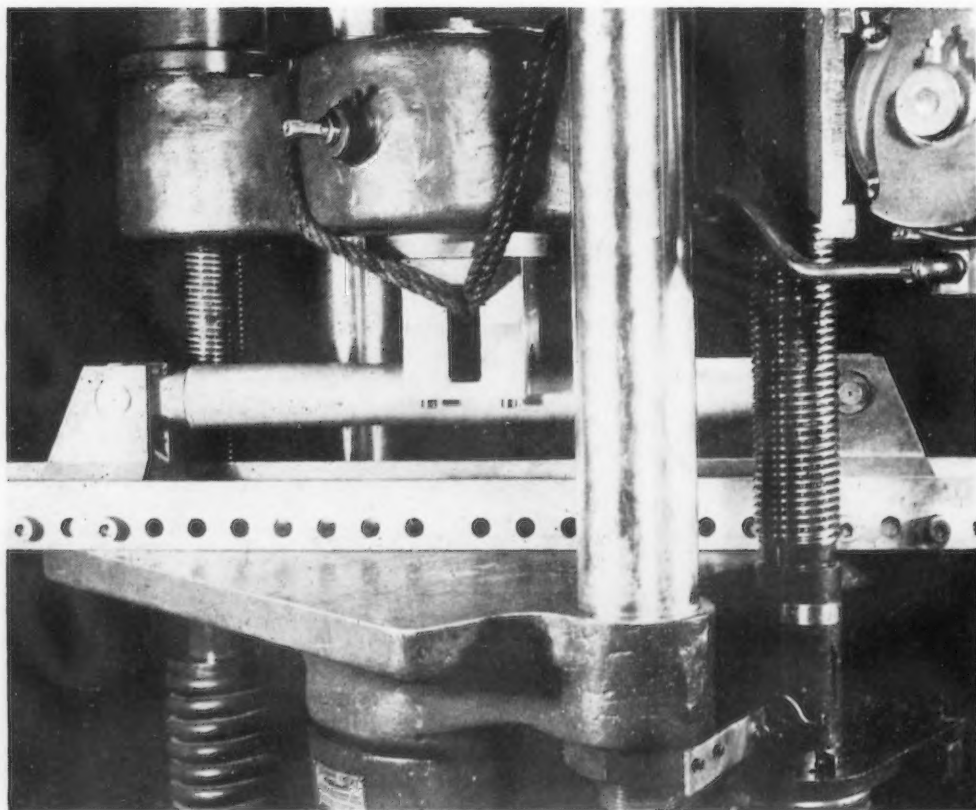
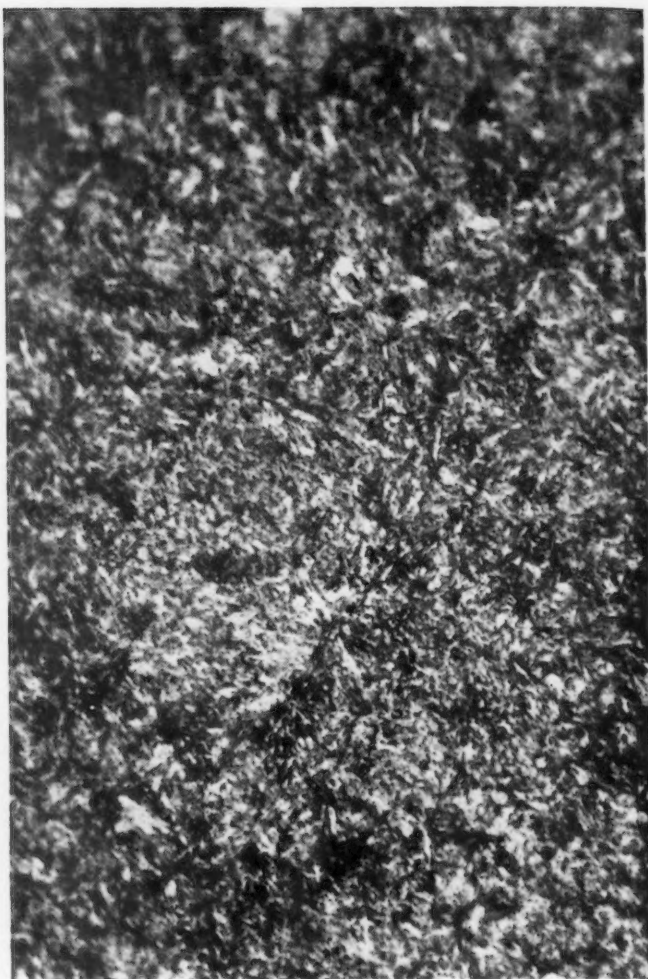
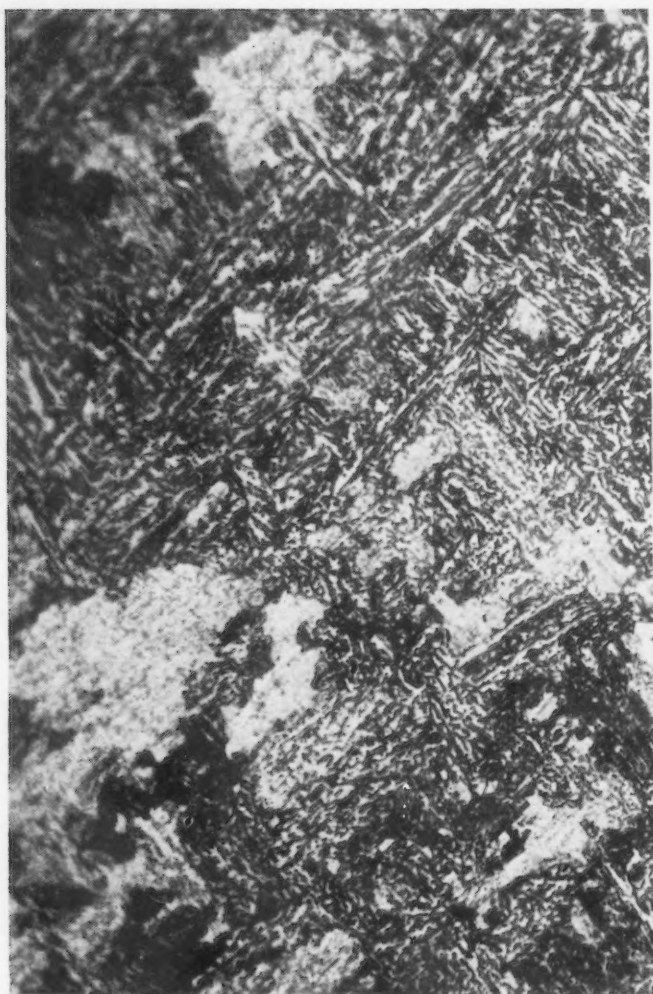
In order to distinguish between the process as applied to the aircraft industry and the process as it is being used commercially, the name Uniweld has been adopted by Menasco to identify the type of pressure welding that is in use in the manufacture of landing gears.

In studying an ideal cycle of this welding process, it will be seen that the instantaneous temperature of the specimen, the rate of temperature rise, the time, the total gas flow, and the degree of upset with its at-

Solid-phase welding by means of an oxyacetylene torch and hydraulic pressure has been designated "Uniweld" by Menasco Mfg. Co., when used in the fabrication of aircraft landing gears. Joints made by this method show no line at the weld, and the grain pattern is complete, and interlocks across the weld plane, resulting in 100 pct joint efficiency. Due to the absence of weld metal there is a substantial saving in weight, and joints so welded respond to heat treatment in the same manner as the parent metal.

tendant shortening of specimens, are all variables. By the same token, they provide values that may be measured and used as a means for indicating the progress of the weld. However, consideration from a practical standpoint indicates the entry of other factors which lessen the degree of reliance that can be placed on some of these possible methods of control. For instance, a draft of cool air may affect the time required to raise the metal to a predetermined temperature, or the original temperature of the steel might vary over a considerable range. These potential variations exclude the use of total gas consumption or total time as a means of control. Experience has also shown that temperature measurement is not a reliable method of measuring the progress of the weld.

However, the degree of shortening, or amount of upsetting of the metal at the joint, under conditions of constant pressure and heat input, has proven to be an entirely satisfactory method of control. It is a relatively simple matter of control, electrically, the amount of specimen shortening. This method is being used, therefore, as a universal means of weld control.



UPPER LEFT

FIG. 4—Photomicrograph of a cross-section of weld in the as-welded condition. Note the large size of grain structure.

o o o

ABOVE RIGHT

FIG. 5—After normalizing, hardening and drawing, the weld shown in fig. 4 has this appearance. Note complete grain recovery.

o o o

LEFT

FIG. 6—Welded specimen ready for testing on Baldwin-Southwark physical testing machine. Load is applied by means of a saddle, as shown.

In the development of reliable controls to achieve duplication of welds that would consistently meet the stringent requirements of the aircraft industry, it was obvious that such means of control must be more accurate than those which were in general use throughout industry. It has been pointed out that the ends to be welded are machined to a smooth surface. The necessary quality of end preparation was found to be dependent on the composition of the base metals being welded and the expected strength efficiency of the weld. For the medium and high carbon, and more particularly the alloy steels, very close mating and rigid adherence to cleanliness must be observed. All air and foreign material that might cause physical or chemical discontinuity between the abutting faces must be excluded if 100 pct efficient welds are to be expected.

During the investigation of control methods, it was found that acceptable flame conditions could not be consistently reproduced by reliance on pressure regulators in the oxygen and acetylene lines. In order to overcome this deficiency, flow meters were installed on the down-stream side of the pressure regulators, and adjustments in the flame were made from the flow meter readings rather than the pressure regulators. In this manner, it was found possible to consistently duplicate flame conditions and produce acceptable welds.

The equipment required for Uniwelding is essentially a hydraulic press equipped with the necessary fixtures for holding the parts in alignment, a heating head, and a device for measuring and controlling the gather. The machine shown in fig. 1 is capable of welding 100 sq in. of abutting surface in diameters up to 20 in. Operation of the machine is completely automatic after the flame head is lighted by the operator.

The water-cooled heating head is designed to apply heat in a manner that will produce a high temperature at the weld interface. The heat gradient must be considered and the head adjusted to eliminate all possibility of differing thermal expansions in the two parts. Otherwise, a portion of the joint might open up and be exposed to the formation of oxides. The heating head is usually oscillated during operation, in order to spread the heat from each orifice over an area to prevent burning of the metal under the flame tip.

For each new Uniwelded diameter attempted, a test run is made prior to the production run. Metallurgical specimens are prepared, machined to the necessary tolerances, and welded. The finished specimens are then cut into coupons which are rigidly tested for proper alignment of parts, the contours of the flow lines, size of the upsets and the possibility of the presence of oxides on the weld plane.

The four cross-sectional views, fig. 3, show the progress of a weld in a $\frac{1}{4}$ -in. wall specimen. During the first 40 sec, no apparent change is visible, but as can be seen, the upset or bulge, is formed during the last one third of the weld time. It can be seen that the weld progresses from the outside to the inside of the tube section. The flow of heat each side of the weld may be measured by the length of the dark sections away from the weld plane.

Fig. 4 shows a very small area of the weld plane, which bisects the picture vertically. The size of the grain structure is very large in the as-welded condition represented here. This grain growth, taking place during welding, causes the two metals to be-



FIG. 7—Welded specimen in which failure has occurred in the parent metal. Weld line is at the center of the illustration, and is invisible.

come as one. (Note that it is impossible to locate any definite line of the weld. The grain pattern is complete and interlocking across the weld plane.)

Fig. 5 shows the same weld as fig. 4 at the same magnification, after the weld has been normalized, hardened, and drawn. It can be seen that a complete grain recovery has taken place, and the pattern of the structure is the same at the weld plane, which bisects the picture vertically, as at any other part of the specimen. This characteristic cannot be found in any other weld process. It follows, then, that if no weld plane can be detected in the structure, the part is equal in strength to a one-piece unit.

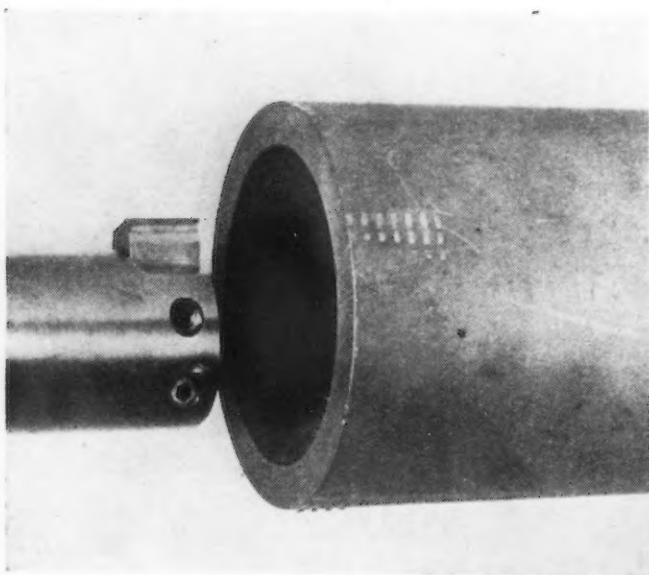
Bend testing welded specimens of medium carbon, low alloy steels in the as-welded state will not produce a reliable index to the quality of the weld, because the weld itself is harder than the adjacent area of metal. This condition causes failure of the test specimen at a value below that required to cause failure in the weld area.

Tensile testing also has several limitations. Test coupons cut from welded specimens are not satisfactory because the restraint found in a full tube is lacking in the coupon. The coupon, therefore, has greater freedom to fail in angular shear, without undergoing full tensile stress at the weld plane. This type of failure is typical of coupons cut from tubing. Inferior quality heat-treated welds which would fail under a fairly severe bend test would quite commonly fail in tension with apparent full tensile values.

Another factor is that tensile tests in the usual laboratory physical testing machine are limited to a rather small cross-section, where bend testing of large tubes can be accomplished by merely making the tubes longer. The ultimate strength of the weld can best be

demonstrated by the static bend testing of full-size tubes. Fig. 6 shows the method used by Menasco to support tubes for testing. Before any flight weld or part is welded, the test welds must be made, and pass this type of bend test. The loading saddle is in place and the specimen is ready for testing. All specimens are loaded to 75 pct of the ultimate calculated strength in four positions 90° apart, and the load is held for 30 sec. After proof loading, the tube is loaded to destruction.

Fig. 7 shows a tube that has failed by rupture of



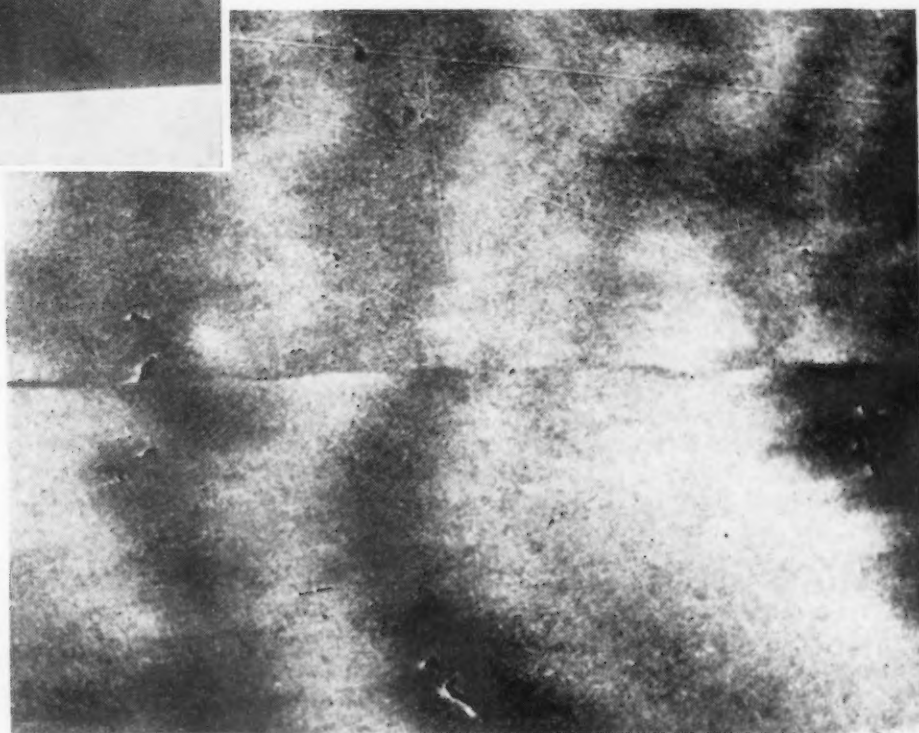
ABOVE

FIG. 8—Special boring tool used for obtaining chips from the upset on the ID of welded tubes.

o o o

RIGHT

FIG. 9—Uniweld as it appears under the microscope when etched with alkaline chromate.



the parent metal. This tube was welded in the center of the view, and then machined completely across the weld to a constant cross section, both inside and out. No reinforcement was left at the weld. Location of the rupture proves 100 pct weld efficiency.

Development of a reliable inspection method to check the quality of welds has been a major problem. If it were possible to examine a cross-section of each weld without destroying the part, this would be ideal. This being impossible, however, it has been found that microscopic examination of a chip removed from the weld plane provides a very satisfactory alternative. The chip, procured from the internal upset by use of the tool shown in fig. 8, is removed in a tightly-

coiled form. It is then mounted in a bakelite briquette, cut through the center (at the weld plane) and polished for examination. The presence of oxygen in the weld plane was suspected to cause flat plane weld failures. After the alkaline chromate solution for the detection of oxygen segregation in steel was developed by the Menasco laboratory, it was tried on cross-sections of Uniwelds. The results have been very satisfactory.

An article by Leslie Fine, Menasco metallographer,¹ will discuss in detail the reaction of oxygen with steel at high temperatures. Briefly it is shown that when a

¹ To be published shortly in "Metal Progress."

sample of steel is heated in a furnace to a high temperature, and allowed to cool in air, the region of the sample immediately beneath the scale appears as a layer of material which etches light in the alkaline chromate solution, thereby revealing the presence of oxides.

After it was found that Uniwelds displaying the telltale white zone were also lacking in strength, a study was made to determine whether or not heat

treatment might diffuse the oxygen segregation away from the weld plane. When temperatures within the practical heat treatment range were used, it was found that the rate of diffusion was too slow to be considered for industrial application. The only other practicable alternative method of securing good welds is to eliminate the white zone, both in the weld and on the surface. Fig. 9 illustrates the appearance of such a weld under the microscope. The alkaline chromate etch has proven the absence of oxides.

The weight-saving possibilities of the Uniweld process, especially as applied to the production of aircraft landing gear, are numerous. For example, a single set of struts now being manufactured by Men-

asco for a sky giant of the future has been reduced in weight a total of 2500 lb by the application of Uniweld to its fabrication.

Another example is apparent in the Republic P-47-J landing gear produced by Menasco. Uniweld, in this case, allowed a weight reduction of 51 lb over the predecessor P-47-B. It may be noted that this saving equals approximately 25 pct of the total original weight of the strut.

Uniwelding gives the design engineer a weld which

can, section for section, meet the requirements and characteristics demanded of the base metal. Since no weld metal is added, nor is the metallurgical analysis of the metal at the weld altered, a Uniweld responds to heat treatment in the same manner as the parent metal.

Although proper design is mandatory, Uniwelding equipment is relatively simple and the method of heating involves no great investment, nor are large power peak or standby facilities necessary.

Recent Experiences in Sintering

IN a detailed article in *Jernkontorets Annaler*, No. 8, 1945, Birger Hessle discusses the advantages derived from the use of iron ore sinter in blast-furnace charges in Sweden, according to a translation in *Metalurgia*.

These advantages are: A lowering of the consumption of fuel in blister steel blast furnaces; a considerable increase in the production per furnace unit; the ability of the mines to dispose of low-percentage ores which would otherwise have been largely left on their hands.

About 900,000 tons of sinter were manufactured from Swedish raw materials in 1939. The problems of sintering are examined from the point of view of the use of sinter in charcoal blister steel blast furnaces, except where otherwise stated.

The chemical properties required in sinter for use in charcoal blister-steel blast-furnaces are:

- (1) High iron content.
- (2) Low content of deleterious substances such as sulphur and arsenic.
- (3) Low content of difficulty reducible ingredients such as iron silicates, etc.
- (4) High degree of oxidation to facilitate indirect reduction.
- (5) Uniform composition, so that special slag formers need not be supplied to the blast furnace.

The physical properties required are:

- (1) Adequate mechanical strength to ensure that the sinter is not broken up too small during crushing and transport.
- (2) Adequate strength to resist the conditions prevailing in the blast furnace.
- (3) High microporosity to facilitate indirect reduction.

The author distinguishes between two types of sinter, which he describes as "rush-burnt" and "black-burnt," respectively. The former has been subjected to vigorous and the latter to less vigorous thermal treatment. Good black-burnt sinter possesses a higher degree of reducibility and of mechanical durability than the "rush-burnt" variety.

Illustrations show the temperature curve throughout the sintering process for both types of sinter, and

divide the process into zones, of which No. 1 is that nearest the grate surface and No. 10 (the last) the stratum nearest to the surface of the charge; in this connection a diagram shows the distribution of temperature through the load at a given moment.

In zones 1 and 2 there is an almost constant temperature, the moisture not yet having been expelled. The hot gases from zone 4 rapidly evaporate the moisture in zone 3. Zone 4 is the preheating zone, in which the charge is brought to the ignition temperature of the fuel by the hot gases from the combustion zone, zone 5. Here the load is an incandescent powder without appreciable fritting or binding characteristics. In this zone there is reduction of Fe_2O_3 , but practically no oxidation of Fe_2O_3 . Zone 6 is the first oxidation zone, where a part of the Fe_2O_3 is oxidized to Fe_3O_4 , with rising temperature. Zone 7 is the equilibrium zone, with comparative equilibrium between Fe_2O_3 and Fe_3O_4 . Zone 8 is the second oxidation zone, where further oxidation of Fe_3O_4 to Fe_2O_3 takes place. Zone 9 is the cooling zone, and in the final zone, No. 10, constant conditions prevail.

A diagram shows how the applied heat is used up in the process to make up for heat losses, and the author describes various methods of reducing the heat losses due to radiation during ignition, heat expended on the expulsion of moisture and the heat remaining in the sinter and the rejected portion of the load. Two other sources of heat loss, namely, the physical heat in the waste gases and the heat required for splitting up the carbonates, can hardly be remedied. In this connection the mutual effects of varying the fuel, moisture content, quantity of air and quantity of fuel are examined in detail and illustrated by graphs. Various methods of modifying these factors are given.

The production of good "black-burnt" sinter demands that a certain sintering temperature shall be attained, but not exceeded, and that the period of time at and immediately below that temperature shall be short, and in order to ensure the fulfilling of these conditions attention must be paid to:

- (1) Even mixing of the charge.
- (2) Loose and uniform charging.
- (3) Simultaneous and uniform ignition.
- (4) The fine crushing of the fuel; and
- (5) the maintenance of a plentiful air supply.

Heat Treatment of High-Speed Steel

Cooling From the Austenitizing Temperature (Cont.)

MARTENSITE Formation—The third range of austenite activity is represented in fig. 7 by the horizontal lines intercepting the bainite C-curves. Austenite decomposition in this range is most important from the standpoint of ordinary commercial practice, for it is here that the real hardening of tools occurs. In other words, if the steel has been cooled so as to avoid transformation in the upper ranges, the austenite decomposes into martensite at these lower temperatures.

Several fundamental characteristics of the austenite-martensite reaction may be deduced from the nature of the transformation lines in fig. 7. The fact that the martensite lines are horizontal means that the austenite-martensite reaction occurs primarily during cooling, rather than isothermally like the spheroidite and bainite transformations. If the

18-4-1 steel, for example, is quenched to a temperature of 300°F the decomposition of austenite begins at 420°F, proceeds as long as the cooling is continued, and ceases at 300°F when the cooling stops. At this temperature, the steel contains, according to the curves, about 40 pct martensite. Holding at 300°F causes practically no further martensite formation regardless of the length of the holding time. However, prolonged holding eventually causes some isothermal austenite decomposition when the martensite horizontal meets the bainite C-curves extending down from the higher temperatures.* The

* A very minor amount of premature isothermal bainite transformation occurs during holding in this range as a result of the nucleation effect of the martensite needles present. This explains the slight upward bend of the otherwise horizontal transformation lines.

** Prolonged interruption of the cooling tends to stabilize the remaining austenite and hence the resumption of the martensite formation during subsequent cooling may be somewhat retarded.

FIG. 12—Effect of carbon content on the M-point of 18-4-1 high-speed steel (Payson).⁸

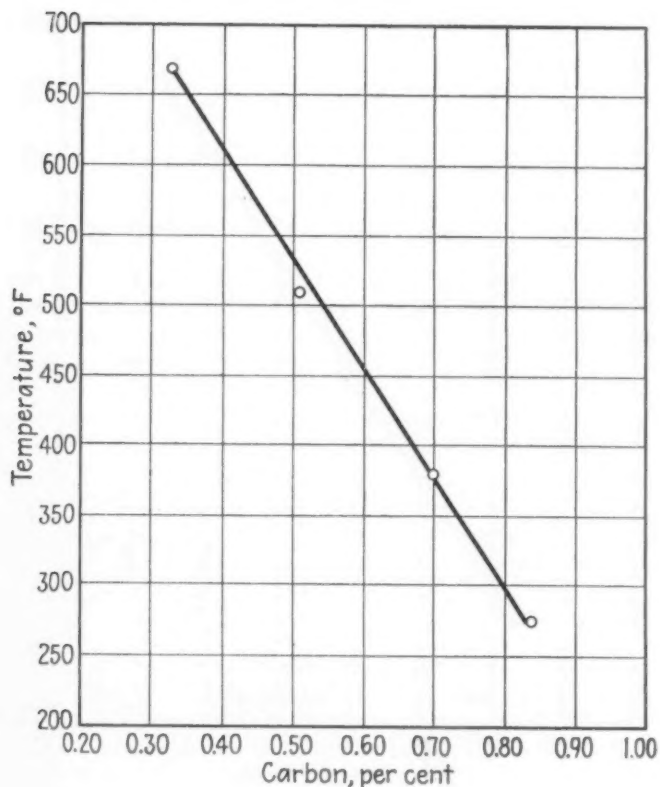
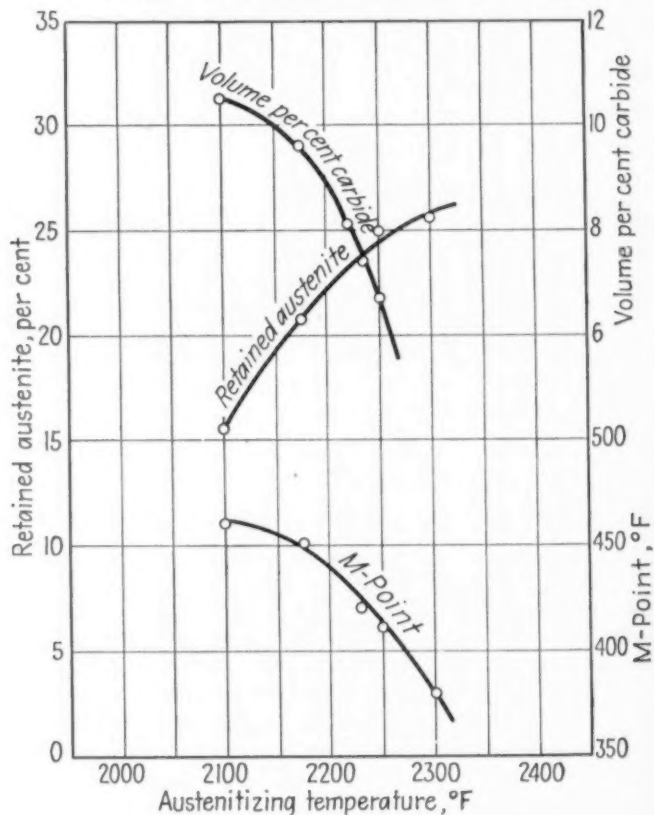


FIG. 13—Percent retained austenite, percent of undissolved carbide, and M-point of tungsten-molybdenum (6-5-4-1 $\frac{3}{4}$) high-speed steel as a function of austenitizing temperature.



Having introduced the background concepts of the effects of heat treatment, last week, the authors, in this second section of a five-part article, continue their discussion of austenite decomposition. They also analyze the technical aspects of the role of tempering and its relation to the complex phenomena of secondary hardness.

By MORRIS COHEN and PAUL GORDON

Department of Metallurgy, Massachusetts Institute of Technology

product of this isothermal decomposition is bainite (fig. 11), not martensite. If the cooling is resumed, martensite formation begins again** and proceeds to room temperature.

It may also be noted that the martensite transformation lines extend horizontally all the way to the left-hand end of the diagram. This means that the formation cannot be suppressed or avoided by fast quenching rates, as was the case with spheroidite and bainite formation. The amount of martensite formed depends primarily on the final temperature reached and the previous austenitizing treatment of the steel. It follows, then, that the quantity of austenite carried over into the tempering treatment is not so much a function of the cooling rate as of the ultimate temperature reached during the hardening quench. The effect of varying amounts of austenite on the tempering treatment will be discussed later.

The temperature at which the austenite begins to decompose into martensite during cooling is called M-point. Although the position of the M-point is independent of the rate of cooling, it is effected in a very definite manner by the composition of the austenite and hence by the austenitizing temperature. It has been shown that carbon, manganese, silicon, nickel, chromium, molybdenum, and tungsten* all act to lower the M-point in steel, the extent of the lowering being proportional to the amount of the element dissolved in the austenite. However, only carbon has a major effect on the M-point of high-speed steels. The effect of carbon content on the M-point of 18-4-1 high-speed steel is illustrated in fig. 12. It is seen that a change in the carbon content of as little as ten points alters the M-point by about 75°F.

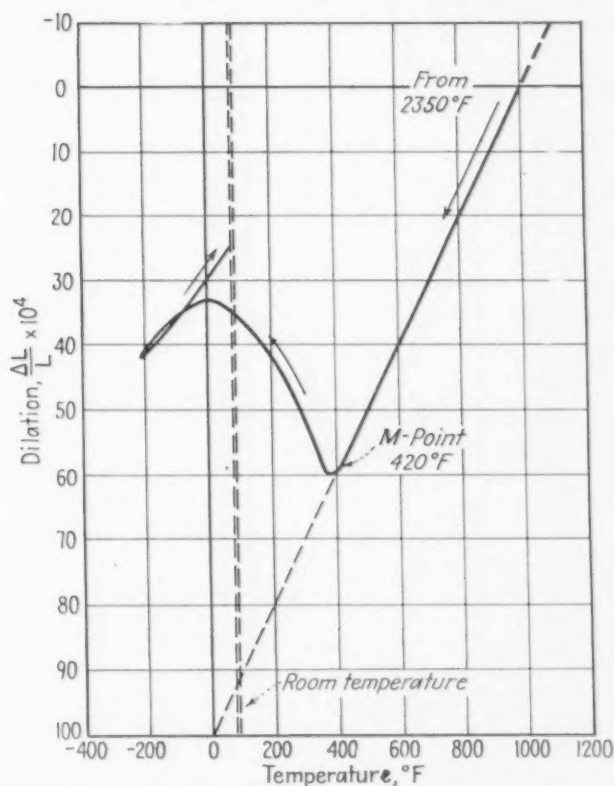
* Payson, P., and Savage, C. H., "Martensite Reactions in Alloy Steels"—Trans. ASM, 33, 1944, p. 261.

The austenitizing temperature, too, exerts a major influence on the M-point. This effect is shown for the tungsten-molybdenum type of high-speed steel in fig. 13. A study of the curves in fig. 13 reveals that as the austenitizing temperature is raised, the percent of undissolved carbides decreases; that is,

the amount of carbon dissolved in the austenite increases, and the M-point is lowered. As a result of this lowering of the M-point, less of the austenite has an opportunity to transform by the time room temperature is reached, and, consequently, the amount of retained austenite increases as the austenitizing temperature is raised. The time of holding at the austenitizing temperature also influences the M-point; the longer the holding time, the lower the M-point, but this effect is minor except in the range of very short holding times.

The Inactive Bay Region—Between the ranges of spheroidite and bainite formation there is a region

FIG. 14—Dimensional changes during the hardening of 18-4-1 high-speed steel (Gordon and Cohen).¹⁰



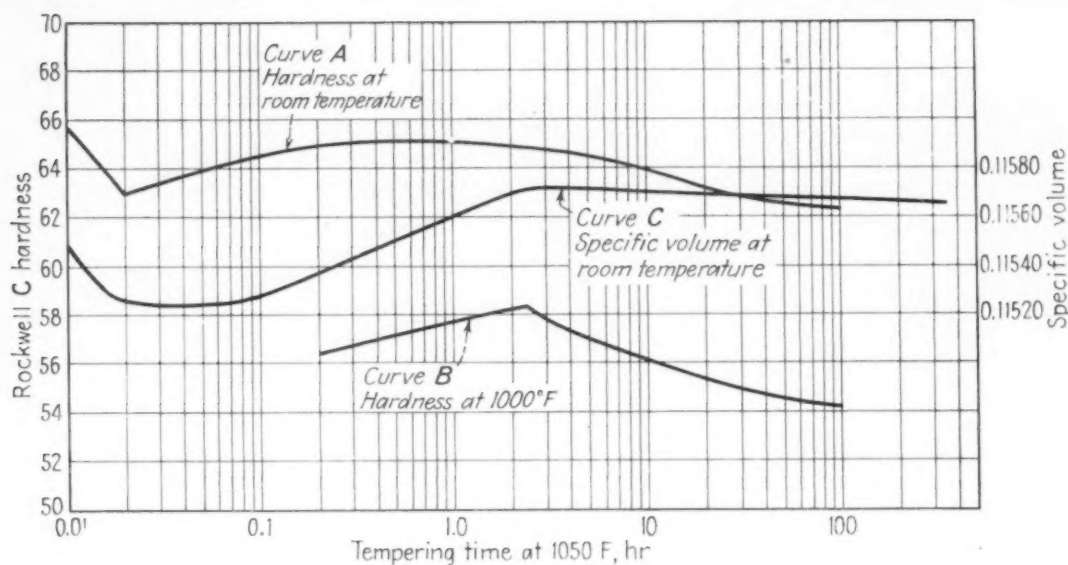


FIG. 15 — Room temperature hardness, hot hardness, and specific volume of 18-4-1 high-speed steel as a function of tempering time at 1050°F after quenching from 2350°F (Bishop and Cohen).¹²

in which the austenite is extremely stable. Holding in this range for periods as long as several days after direct quenching from the austenitizing treatment has been observed to produce no measurable isothermal decomposition of the austenite. Knowledge of this inactive bay region is the basis for the commonly used salt-bath quenching at temperatures of 1000 to 1200°F. In this technique the tools to be hardened are quenched into a molten bath from the high heat, held there long enough to extract the major portion of the heat, and are then cooled comparatively slowly, usually in air, to room temperature. The intermediate quench thus used in the hardening operation might well be called a prequench, for it does for the "cooling from" the hardening temperature very closely what the preheat does for the "heating to" the hardening temperature. In other words it acts to minimize the danger of cracking and warping by reducing the stresses resulting from thermal shock superimposed upon the hardening transformation. In addition, when the austenitizing treatment has been carried out in a salt bath, the prequench serves to remove any high-temperature salt adhering to the tools and thus eliminates the difficult problem of dislodging the salt after it has cooled and solidified. Such prequenching is quite analogous to martempering as applied to straight carbon and low-alloy steels.⁹

⁹ Shepherd, B. F., "Martempering"—THE IRON AGE, 1943, 151, Jan. 28, p. 50, Feb. 4, p. 45.

Hardening of High-Speed Steel—Normal hardening of high-speed steel seeks to cool the steel from the austenitizing temperature in such a way as to avoid decomposition in the two upper ranges of austenite activity and to allow only transformation of the austenite to martensite. This is usually accomplished either by oil quenching or by prequenching into a molten bath at, say 1100°F, and then cooling in air to room temperature. The reactions occurring in the steel are fundamentally the same in either case. These reactions may be most easily followed by reference to the curve in fig. 14, which represents the dimensional changes taking place in 18-4-1 steel during the hardening quench. From the

austenitizing temperature of 2350° to 420°F only the normal thermal contraction is observed. During this period, the steel has the same structure as it had at 2350°F; that is, it consists entirely of austenite plus undissolved carbides (fig. 1). At 420°F, however, the M-point is reached and austenite begins to transform to martensite. Since martensite has a lower density than austenite, a large increase in volume accompanies this transformation, an increase so marked that the net dimensional effect, as indicated in fig. 14, is an expansion in spite of the continuing tendency for contraction due to dropping temperature. The complicated stress effects arising from this super-imposed expansion often result in the failure of improperly designed and carelessly heat-treated tools. The advantage of air cooling over oil quenching through this range of drastic dimensional change is readily understood, for the slower cooling minimizes thermal gradients and allows the steel more time to adapt itself to the strains set up by the transformation.

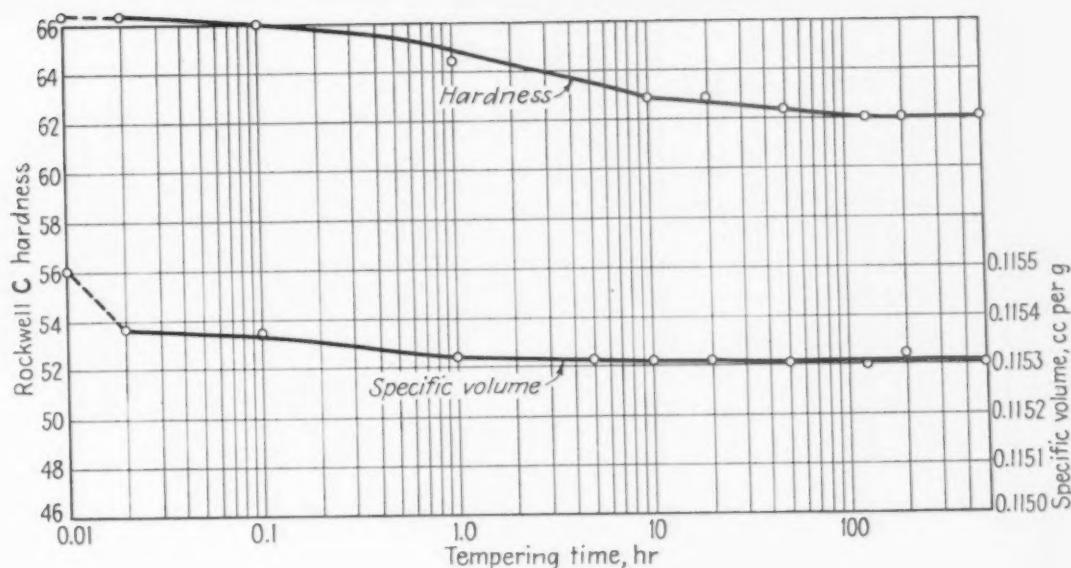
The martensite formation and the expansion continue until room temperature is reached. At room temperature the steel consists of untempered martensite, undissolved carbides, and about 15 to 25 pct of retained austenite. This structure is hard (64 to 66 Rc), but is unstable, brittle, and highly stressed. The subsequent tempering must alleviate these undesirable characteristics without destroying the hardness.

Tempering of High-Speed Steel

The Role of Tempering—Hardened but untempered high-speed steel consists, at room temperature, of three phases—alloy carbides undissolved by the previous austenitizing treatment, martensite resulting from the transformation of austenite during the hardening quench, and about 15 to 25 pct of residual austenite. The steel in this condition is hard, highly stressed, brittle, and dimensionally unstable. A consideration of the kinetics of the hardening process readily explains the existence of these characteristics.

When a tool of high-speed steel is quenched, the cooling rate is never uniform throughout the piece but is fastest at the surface and slowest at the

FIG. 16 — Room temperature hardness and specific volume of 18-4-1 high-speed steel as a function of tempering time at 350°F after quenching from 2350°F (Koh and Cohen).¹¹



center, the difference in cooling rate tending to be the greater the larger the cross-section of the tool. As a result the transformation of the austenite to martensite begins first at the outside of the tool and occurs much later in the central region. Since martensite is much less dense than austenite, the formation of martensite is accompanied by a large increase in volume. Hence, while the central portions of the tool are still undergoing normal thermal contraction, the colder outer portions are actually expanding due to the decomposition of the austenite. Furthermore, when the austenite-martensite transformation with its concomitant expansion finally does begin in the center sections, the reaction in the outer regions is partially spent and the volume changes there are again "out of step" with the changes in the interior.

In other words, the steel during quenching is subjected to tremendous internal strains first by the simultaneous expansion of the outside and contraction of the inner regions and then by the reverse process, the latter being more serious due to the fact that the expansion of the center now must take place against the resistance of the very hard and brittle martensite formed earlier in the outer sections. These effects are accentuated in complicated tools of varying cross-section; for in such cases the difference in cooling rate between thick and thin sections is superimposed upon that between the surface and the interior. At room temperature, after hardening, the steel is obviously in a highly stressed condition. Because of the presence of a high percentage of tetragonal, or untempered, martensite which inherently has little ductility, it is also hard and very brittle. As will be explained in more detail later, both this tetragonal martensite and the metastable retained austenite, in addition to the large internal strains, are potential sources of dimensional instability.

It is the function of the tempering operation in the heat treatment of high-speed steel to render the steel useful by alleviating the internal strains, brittleness and instability, without impairing the hardness. This is accomplished by heating to temperatures generally in the range of 1000° to 1100°F in one or more cycles. During such tempering, high-speed steel de-

velops a secondary hardness which is of the same order of magnitude as the original quenched hardness, and thus the undesirable characteristics present in the quenched steel may be eliminated without much, if any, sacrifice in hardness. This is to be contrasted with carbon and low alloy tool steels which become too soft for tool applications if tempered at these comparatively high temperatures.

Tempering Stages—The tempering of high-speed steel can be conveniently divided into four overlapping stages¹² of which only the first three are encountered in ordinary commercial practice. These stages are illustrated in fig. 15 for 18-4-1 high speed steel by plots of room-temperature hardness, hot hardness, and specific volume against tempering time at 1050°F. The first stage consists of the decomposition of the tetragonal martensite into cementite (or low alloy carbide) and a highly alloyed ferrite matrix. As indicated in fig. 15, these structural changes are accompanied by a drop in hardness and specific volume. The time-dependent nature and the actual magnitude of the decrease in specific volume and room-temperature hardness may be more fully realized by reference to fig. 16 in which the

¹⁰ Gordon, P., and Cohen, M., "The Transformation of Retained Austenite in High Speed Steel at Subatmospheric Temperatures"—*Trans. ASM*, 30, 1942, p. 569.

¹¹ Koh, P. K., and Cohen, Morris, "The Tempering of High Speed Steel"—*Trans. ASM*, 27, 1939, p. 1015.

¹² Bishop, E. C., and Cohen, M., "Hardness Testing of High Speed Steel at High Temperatures"—*Metal Progress*, March, 1943, p. 413.

changes in these properties are shown for a tempering temperature of 350°F. At this temperature the reactions are so slowed down that even after 500 hr of tempering only the first stage is apparent. With the obscuring effect of the overlapping second stage eliminated, it may be seen that the hardness drop is quite appreciable, over four full points on the Rockwell C scale, and the decrease in specific volume is almost 0.2 pct.

In the second tempering stage, complex alloy car-

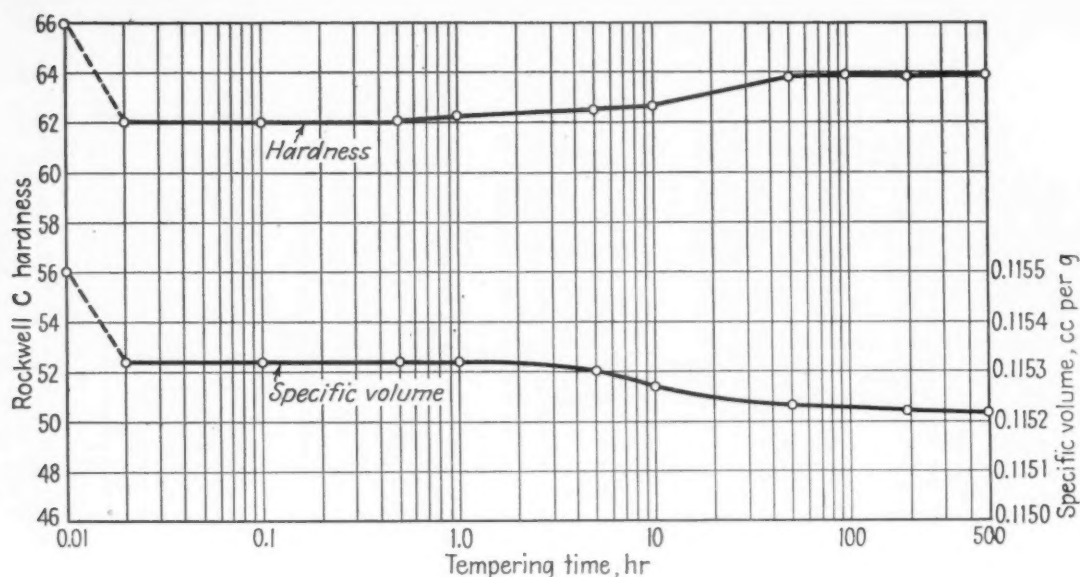


FIG. 17 — Room temperature hardness and specific volume of 18-4-1 high-speed steel as a function of tempering time at 750°F after quenching from 2350°F (Koh and Cohen).¹¹

bides are precipitated from the residual austenite. The precipitation is attended by a further small decrease in volume and an increase in hardness. These changes are observable in fig. 15, but are more readily apparent in the curves of fig. 17 which represents tempering at 750°F.

The third stage of tempering is characterized by the transformation of the residual austenite. This stage is evidenced in fig. 15 by a large increase in volume (about 0.5 pct of the quenched specific volume), a continued rise in room-temperature hardness, and a sharp increase in hot-hardness.

The fourth tempering stage consists of the precipitation of complex alloy carbides from the ferrite matrix of stage one, and the re-solution of the cementite. In normal commercial practice, steels are seldom tempered long enough and at high enough temperatures to encounter this stage.

The combined increase in hardness during the second and third tempering stages composes the phenomenon known as secondary hardening. It is this secondary hardening which overcomes the softening encountered in stage one as a result of the tempering of the primary martensite. The total increase in hardness is approximately 3½ Rc units so that at the point of maximum secondary hardness the steel has about the same hardness as in

the untempered condition. In fact, as shown in fig. 18, the secondary hardness may even exceed the as-quenched hardness if the austenitizing temperature is high.

It may be noted that maximum secondary hardness is attained before the residual austenite transformation is complete. For example, during the tempering of 18-4-1 high speed steel at 1050°F (fig. 15), the room temperature hardness curve reaches its peak of about 65½ Rc after ½ hr of tempering, while the decomposition of the retained austenite as measured by the rise in specific volume is complete only after 2½ hr of tempering. The desirability of tempering for complete austenite transformation rather than for maximum room temperature hardness is clearly indicated both by the curve for hot-hardness in fig. 15, and the values of mechanical properties for 18-4-1 steel listed in table IV as a function of time of tempering at 1050°F (565°C). Although the room-temperature hardness is a maximum after ½ hr of tempering, the transverse strength of the steel, the resistance to torsional impact, and the hot-hardness at 1000°F are below maximum. If, however, the steel is tempered for 2½ hr to attain full transformation of the retained austenite, the optimum values are reached for transverse strength, torsion impact, and hot-hardness, while at the same time the decrease in room temperature hardness is relatively minor, less than 1 Rc unit. Tools tempered for complete transformation have the added advantage over those tempered for maximum room-temperature hardness in that the latter, still containing about one third of the original retained austenite are susceptible to dimensional changes during use as a result of the tendency of the austenite to decompose.

Although the tempering range of 1000°-1100°F is commonly used for the great majority of high speed steel tools, tempering somewhat below or above this range is sometimes employed, particularly in the case of non-cutting applications. Fig. 19 indicates that the hardness and torsional strength of high-speed steel reach their maximum values after tempering at 1000°F, but the accompanying values for torsional toughness and ductility are relatively low. The resistance to torsional impact is greatest after temper-

Designation	Single Tempering	Room Temperature Hardness, Rockwell C	Modulus of Rupture, Psi	Torsion Impact, Ft-Lb	Hardness at 1000° F Rockwell C
1	8 min	65.1	312,000	16	55.0
2	½ hr	65.7	270,000	30	57.0
3	2½ hr	65.0	408,000	48	58.0
4	6 hr	64.5	410,000	48	57.0
5	24 hr	63.8	39	55.0
6	Double Tempering 2½ hr plus 2½ hr	64.5	454,000	83	57.0

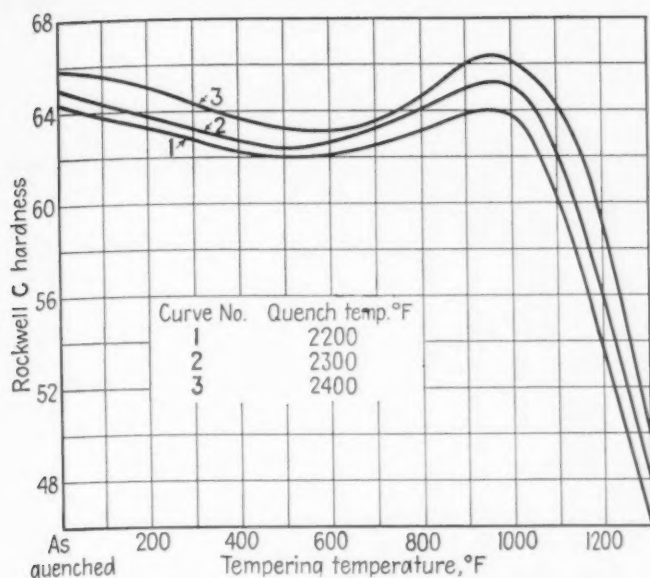


FIG. 18—Secondary hardness may exceed the as-quenched hardness if austenitizing temperature is high.

ing at 900°F, drops to a minimum between 1050° and 1250°F, and then tends to increase at temperatures above 1250°F. Similarly the torsional ductility goes through a maximum at 900°F, a minimum at 1100°, and rises rapidly again at temperatures above 1200°F. Hence, when full hardness is not important, tempering treatments at about 900°F or above 1200°F may be used in order to obtain maximum toughness. It should be emphasized, however, that the 900°F treatment is applicable only when dimensional stability is a secondary factor, for high-speed steel so tempered will still contain approximately 20 pct of retained austenite. The possible conversion of this austenite to martensite during service would be a source of dimensional change. On the other hand, tempering at temperatures

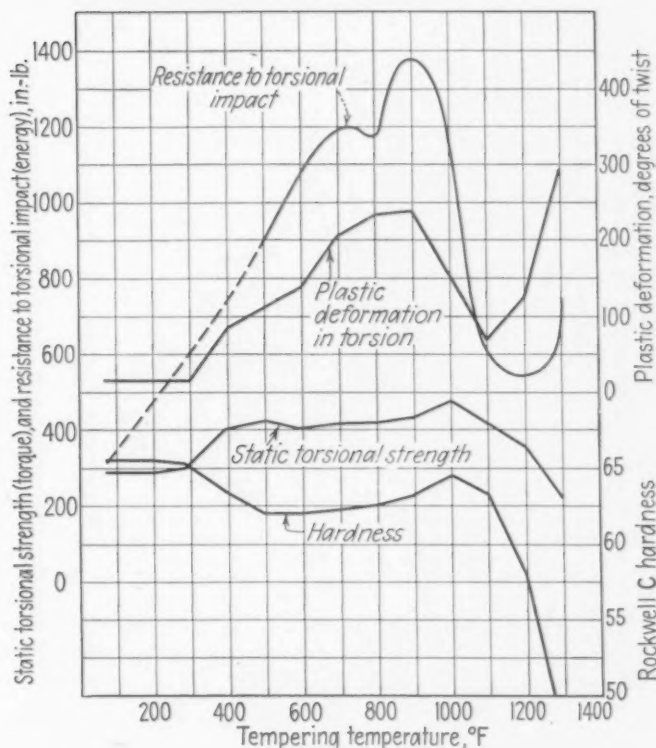


FIG. 19—Hardness and torsional strength of high-speed steel reach their maximum values after tempering at 1000°F, but the accompanying values for torsional toughness and ductility are relatively low.

above 1200°F, though it will cause the decomposition of the retained austenite, cannot be employed where hardnesses greater than 50 Rc are necessary.

Next week the authors will continue their discussion of tempering from the viewpoint of (1) the effects of time and temperature on secondary hardness and (2) the kinetics of the tempering process.—Ed.

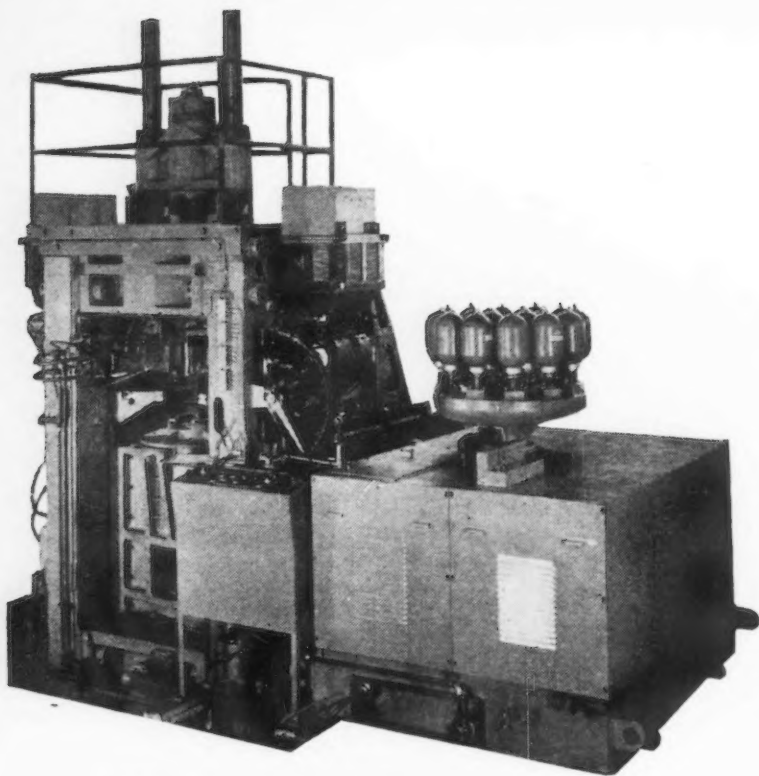
Nitriding Steel by Glow-Discharge

IF A glow discharge is created in an atmosphere containing nitrogen, nitrogen ions with a positive charge will be attracted to the cathode at high velocity. The application of this principle to the nitriding of steel is described by H. Bennek and O. Ruediger in *Archiv fur das Eisenhuettenwesen*, 1944, vol. 18.

In the experimental work described, specimens, 30 mm in diam. and 8 mm thick, of chromium steel and chromium-molybdenum steel were made the cathode in a quartz cylinder held within a discharge tube. Current was supplied from a 110 v to 1500 v transformer and ammonia was used as the source of nitrogen. The discharge tube was exhausted by a two-stage diffusion pump with an oil backing pump.

Several tests were run under various conditions of time, temperature, suction and current. The depth of the nitrided layer and the Vickers hardness were determined and compared with the results obtained by the normal nitriding process.

For equal times of treatment up to 7 to 8 hr greater hardness and a slightly deeper case were obtained by the glow-discharge method. With increasing time the effects of the treatments became more and more similar. Best results were obtained when the current was sufficiently strong for the specimen to be heated by the bombardment. Prominent corners and edges were uniformly nitrided by the glow-discharge process.



Front view of the special vertical flash-butt welder designed by Taylor-Winfield, the largest of its kind ever produced.

o o o

TWO of the largest vertical flash welders ever built, one for General Electric Co., and one for Westinghouse Electric Corp., have been constructed by the Taylor-Winfield Corp., Warren, Ohio.

This machine, hydraulically operated, is a vertical flash-butt welder designed to join solid steel shafts to the turbine bucket wheels of jet propulsion engines. As an indication of its size, it is equipped to take shafts from 1 in. to 6 in. in diam, 12 to 72 in. in length and bucket wheel diameters of 5 to 40 in. The joining of similar pieces for other purposes can be effected on these machines by slight changes in fixture design.

Difficulty in keeping stresses in a straight line on the conventional type horizontal machines led to the designing of this machine in the vertical. Being of the hydraulic press type, close work alignment and allowance of minimum die deflection at the time of upset is made possible.

The machine is comprised mainly of two cast steel frames in a vertical position separated by cast steel brackets which are bolted to the frames at each end. The upset slide is driven by a hydraulic cylinder of 35-in. bore, giving a pressure of 850,000 lb at 1000 psi line pressure.

Keys position both brackets, the upper one being insulated electrically from the side frames. The platen, bearing the bucket wheel to be welded, is mounted on the upset slide which is guided by two attached slide brackets moving vertically in bearings in the side frames. An adjustable bucking nut on the lower end of the piston rod limits the travel of the hydraulic

Flash-Butt Welder

piston. The upset slide's position and travel is shown by a large calibrated dial and pointer, mounted on the right hand side of the frame.

Clamping arms hold the bucket wheel firmly on the platen and also serve as conductors of the welding current. Hydraulic cylinders attached to each of the slide guide brackets, actuate the clamping arms.

The upset pressure is transmitted to the bucket wheel by the upset slide's integral back-up screw, adjustable to butt firmly against the bottom of the bucket wheel. A hydraulic, toggle-operated, horizontal clamping fixture on the lower face of the upper bracket, clamps and supplies welding current to the shaft to be welded to the bucket wheel. Located at the control station are warning lights indicating whether or not clamps are in correct position.

The upper back-up screw, which butts against the upper end of the shaft, absorbs the upsetting force transmitted to the shaft being welded.

Means are provided for proper alignment of the shaft and wheel.

Attached to the hydraulic reservoir is a pumping and control unit supplying controlled hydraulic pressure. The clamping cylinders and the large upsetting cylinder are supplied 96 gpm at 1000 psi by two Vickers Duplex pumps. Oil filters are located in the suction lines and the oil is kept at proper operating temperature by adequate cooling coils submerged in the reservoirs.

A new pneumatic accumulator using nitrogen is mounted on top of the pumping unit. The possibility of formation of an explosive mixture is reduced by the use of nitrogen instead of oxygen. Eighteen drawn steel bottles hold the nitrogen at a precharged pressure of 750 psi, providing at the actual moment of the upsetting of the weld a very large flow of oil at high pressure.

Patented Taylor-Winfield control valves aid in the delivery of the oil directly to the upsetting cylinder. The control valve unit has a follow valve controlling the travel of the upset slide during flashing, a dumping valve enabling rapid upset, and a variable speed (adjustable voltage) motor driven cam, controlling the follow valve during automatic flashing.

Three types of operation may be employed, manual, semiautomatic, or completely automatic. The amount of flashing and upset is controlled by a hand lever in manual operation. In semiautomatic, manual starting of flashing is necessary, and at a predetermined point in the operation a motor driven cam takes over control of the follow valve. In automatic, a preset rheostat governing the cam motor controls the speed

er for Turbine Shafts...

of flashing; cam rise during the complete welding process controls the amount of flashing.

Mounted on the side frames and connected in parallel are two 600 kva transformers providing the welding current. One side of each transformer is connected to the bucket wheel and the other to the shaft by means of the clamping devices.

Four 2400-v electronic contactors control the equipment, and each contactor has two high voltage ignitron tubes. Interlocks between front and rear hinged doors provide automatic dropout of main circuit breaker whenever doors are open. Arrangement has been made for connection with incoming power and water lines from the floor.

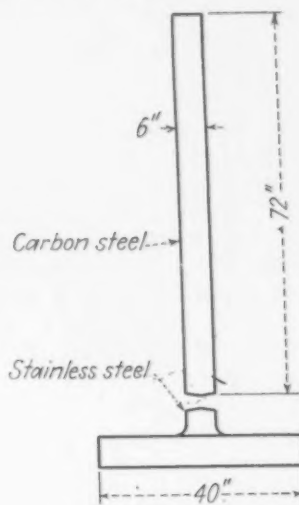
Successful welding of turbine bucket wheel materials is largely due to an important feature of this equipment, the use of electronic heat control (heat control by the phase shift) to adjust the welding current in fine steps.

With the exception of loading, unloading and adjustment, the machine can be operated by one person at the control station. A panel of controls aids the operator in preselection of welding time, hydraulic elements, etc.

Pieces to be welded are placed in their proper positions in a carriage-type fixture mounted on rails and

the carriage is pushed into the machine against a stop. The work is presented to the machine in an assembled position. The fixtures then clamp the work in the machine in the proper position and the carriage is re-

THIS sketch of the shaft and turbine bucket wheel for a jet propulsion engine gives some idea of the capacity of the new welder.



moved. After the welding process is completed the welded assembly is removed from the machine by the same carriage.

High Purity Zirconium Metal

THE major improvements in processes for purifying zirconium metal are traced down to the present methods of producing both powdered and massive metal of high purity by D. B. Alnutt and C. L. Scheer in a paper entitled "Zirconium Metal, Its Manufacture, Fabrication and Properties," presented before *The Electrochemical Society*. The apparatus used and some of the problems encountered in producing this high purity metal are described. Since the mechanical properties of zirconium are greatly influenced by both the type and amount of absorbed gases, special precautions were observed to bring about absolute degassing of the metal.

In testing for the drawability of the metal, two difficulties had to be overcome: (1) The metal work-hardens so rapidly that considerable annealing was required throughout the drawing process, and (2) a thin film of oxide must be used as a lubricant in the drawing operation due to the property of Zr to seize to the die walls. In spite of these difficulties, wire has been drawn to 0.002 in. diam with standard commercial equipment, which in the annealed state has a tensile strength of 60,000 to 80,000 psi and elongation of 15 to 20 pct.

It is usually not possible to roll wide pieces of Zr into thin sheet without relieving the strains set up by cold working. Since annealing is difficult, in view of the great affinity of the metal for common gases, a combination of cross rolling, annealing and lengthwise rolling was worked out, which permits economical production of sheet in sizable quantities. Zirconium sheet, fully annealed and of good surface can be produced in strips up to 1 in. wide by 4 ft. long, or in greater widths of shorter length. The metal in the unannealed condition has a tensile strength of about 115,000 psi, and fully annealed sheet, 70,000 psi. The strength in the fabricated form is so dependent on the amount of work-hardness left in the metal, however, that widely varying results are possible.

The most important chemical property of zirconium is its corrosion resistance. Further, it has the rare property of causing dropwise condensation, i.e., vapors condensing on a Zr surface do not form a film of liquid but condense as discrete drops. This form of condensation is most desirable from the point of view of the efficiency of heat transfer.

... Engineers Study Technological

CHICAGO was host last week to some 3000 engineers and industrial executives who attended the 163rd annual all-division meeting of the American Institute of Mining and Metallurgical Engineers, the first annual meeting held outside New York in 34 years.

The engineers of the metalworking industries who thronged the five-day meeting at the Palmer House found their attention directed to such subjects as powder metallurgy, blast furnace and open hearth operation, the electron microscope, commercial potentialities of ductile titanium, open-hearth bath-temperature measurement and steel and nonferrous metallurgy. As background music to these practical, everyday technical discussions, the engineers heard the oft repeated but never boring hopes and fears for atomic power.

Louis Shattuck Cates, president, Phelps Dodge Corp., was installed as president of the institute at the annual banquet Wednesday. He succeeds Harvey S. Mudd. Mr. Cates, identified with copper mining during his entire professional career, holds, among other honors, the William Lawrence Saunders Gold Medal (1939), has been president of both the American Mining Congress and the Mining and Metallurgical Society of America and at different times has served four terms as director of AIME.

William E. Brewster, general superintendent, Wisconsin Steel Works, International Harvester Co., Chicago, was installed as chairman for 1946 of the Iron and Steel Division of the institute. A long time AIME member, Mr. Brewster has served in the past as chairman of the division's Blast Furnace and Raw Materials Committee. Louis W. Kempf, metallurgist, Alumi-

num Research Laboratories, Aluminum Co. of America, Cleveland, assumed chairmanship of the Institute of Metals Division.

Among the awards presented at the meeting for outstanding contributions to the engineering sciences of the metalworking industry were the following:

John Fritz Medal—Awarded to Zay Jeffries, vice-president, General Electric Co., this medal one of the highest honors to be achieved by an engineer, was presented in recognition of "leadership in the solution of problems affecting the production, conservation, substitution and scientific appraisal of metals and alloys." Awarding of this medal to Dr. Jeffries served as further recognition of the status of this 58-year old metallurgist as one of the outstanding engineers of this age. Other honors previously conferred on Dr. Jeffries include the James Douglas Medal (AIME), the Sauveur Achievement Award (ASM), Clamer Medal (Franklin Institute) and the Powder Metallurgy Medal (Stevens Institute of Technology). As recipient of the John Fritz medal, Dr. Jeffries takes a position alongside such notables and previous holders of the award as George Westinghouse, Thomas Edison, Henry M. Howe, Sir Robert Hadfield and Paul D. Merica.

John E. Johnson Jr. Award — Presented to John J. Alexander, assistant superintendent, power department, Corrigan-McKinney plant, Republic Steel Corp., Cleveland. The presentation of this award to Mr. Johnson cited his successful efforts in developing a method of connecting two turboblowers in series in order to blow 100,000 cu ft per min of wind at high



W. E. BREWSTER, general superintendent, Wisconsin Steel Works, International Harvester Co., Chicago, new chairman of Iron and Steel Division, AIME.



L. W. KEMPF, metallurgist, Aluminum Research Laboratories, Aluminum Co. of America, Cleveland, installed as chairman, Institute of Metals Div., AIME.



JOHN FRITZ MEDALIST: Zay Jeffries, vice-president, General Electric Co.

Problems . . .

163rd annual AIME meeting at Chicago attracts 3000 engineers to sessions covering such subjects as powder metallurgy, atomic energy, ductile titanium, non-ferrous metallurgy, open hearth and blast furnace operation, and the electron microscope.

pressure, and for his work on adding a controlled amount of moisture to the blast.

Rossiter W. Raymond Memorial Award—Conferred annually upon the author of the best published paper by an author under 33 years of age, this award was presented to Capt. John H. Hollomom of Watertown Arsenal, for his paper entitled "Tensile Deformation." This 27-year old metallurgist has been serving as chief of the physical metallurgy section at the arsenal.

Institute of Metals Division Award — Presented jointly to Capt. P. W. Bakarian and C. H. Mathewson for a paper entitled "Slip and Twinning in Magnesium Single Crystals at Elevated Temperatures." Capt. Bakarian, associated with Dow Chemical previous to his entry into the service, has been assigned to the Material Laboratory, Wright Field, Dayton. Dr. Mathewson is professor of metallurgy, Hammond Laboratory, Yale University.

Howe Memorial Lecture—Presented this year by T. L. Joseph, professor of metallurgy and assistant dean, Minnesota School of Mines and Metallurgy. Dr. Joseph, who has previously been awarded the J. E.

Johnson Jr. and the Hunt medals, presented a paper entitled "The Blast Furnace Process and Means of Control."

Dr. Joseph pointed out that during the war years all emphasis was placed on production of pig iron with little thought given to efficiency and control. Now that the war is over and competition is the primary factor, fuel efficiency and control will once again become paramount. This is important, since the increase in pig iron output is obtained at a loss in efficiency.

As the hearth diameter increases from 12 to 30 ft there is a large increase in total hearth cross-section.



LOUIS S. CATES: Installed as president of AIME for 1946. Mr. Cates is president, Phelps Dodge Corp.



J. E. JOHNSON JR. AWARD: John J. Alexander, power dept., Republic Steel Corp., Cleveland.



INSTITUTE OF METALS DIVISION AWARD: C. H. Mathewson, professor of metallurgy, Hammond laboratory, Yale University, co-recipient with Capt. P. W. Bakarian.



INSTITUTE OF METALS DIVISION AWARD: Capt. P. W. Bakarian, material laboratory, Wright Field, Dayton, co-recipient with Dr. Mathewson.

tional area, but a small increase in effective area. Based on an active annulus of 6 ft, the effective area drops from a relative value of 90 pct for an 18-ft hearth diameter to 62 pct for a 30-ft diameter. With this in mind it is apparent that the law of diminishing returns has been finally realized on the use of large furnaces, since we are not now utilizing all available furnace volume.

Particle size distribution and its effect on gas flow is at least partly responsible, Dr. Joseph said. Gases flow along the periphery of the furnace hearth and the furnace is more active in this zone than in the core. Also, radial distribution of gases in the upper part of the furnace is far from ideal. The open permeable center due to large particles of coke and a very thin layer of iron ore, causes irregularities in gas flow, as compared with the periphery, since gas flow depends upon the resistance offered by the constituents. Particle size distribution of raw materials normally used, causes regions of high gas velocity with subsequent low efficiency of heat transfer. Further, high gas flow results in low temperatures. Hence the differences in resistance to gas flow offered by the periphery and the center section cause fluctuations in temperature which subsequently cause variations in the iron analysis. For example, a temperature rise of 40° F increases the silicon content by about 10 points.

Two recommendations were made by Dr. Joseph to alleviate the poor operating conditions of large blast furnaces. The first is that the fluctuations in gas flow across the furnace can be controlled by dropping the stock line, because the ore layers become thicker at the periphery, the lower the stock line, and hence more resistance to gas flow at the periphery. The second thought is that beneficiating raw materials and utilizing more of the upper volume of the blast furnace, higher blast temperature, an improvement in coke rate and an increase in efficiency and output can be realized.

As a sidelight on the presentation of the awards,

T. L. JOSEPH,
Howe Memorial
Lecturer for
1946. Dr. Joseph
is professor of
metallurgy, and
assistant dean,
Minnesota
School of Mines
and Metallurgy.

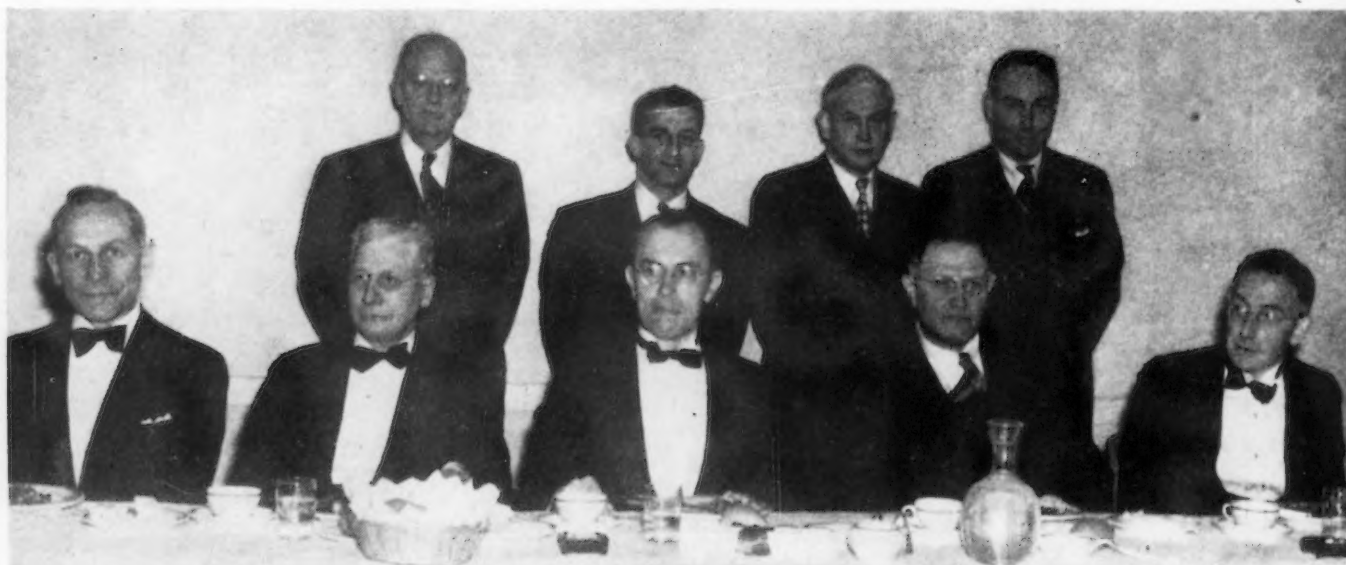


ex-president Herbert Hoover was among the 18 AIME members who joined the institute's Legion of Honor in recognition of 50 years as an AIME member.

The technical program of the meeting was unusual both in scope and in detail, covering as it did many of the war-born technological problems facing industry and exploring in considerable detail many of the practical everyday problems of the mine and mill. Too, the problems of the future were not ignored for outstanding authorities reported on current trends of thought in such fields as the commercial application of atomic energy, and the training of future engineers.

Abstracts of papers attracting more than usual interest at sessions held by the Institute of Metals Division and the Iron and Steel Division are presented herewith.

NOTABLES AT dinner held by Institute of Metals Division. Standing, left to right, are G. P. Halliwell, vice-chairman, Chicago section, AIME; P. W. Bakarian, co-winner of the metals division's medal; E. G. Hill and J. L. Christie, AIME directors. Seated, left to right, L. W. Kempf, new division chairman; Dr. Mathewson, co-recipient of the IMD medal; E. E. Schumacher, presiding officer at the dinner; R. G. Gustavson, University of Chicago, principal speaker at the dinner; and C. S. Smith, director, Institute for the Study of Metals, University of Chicago.



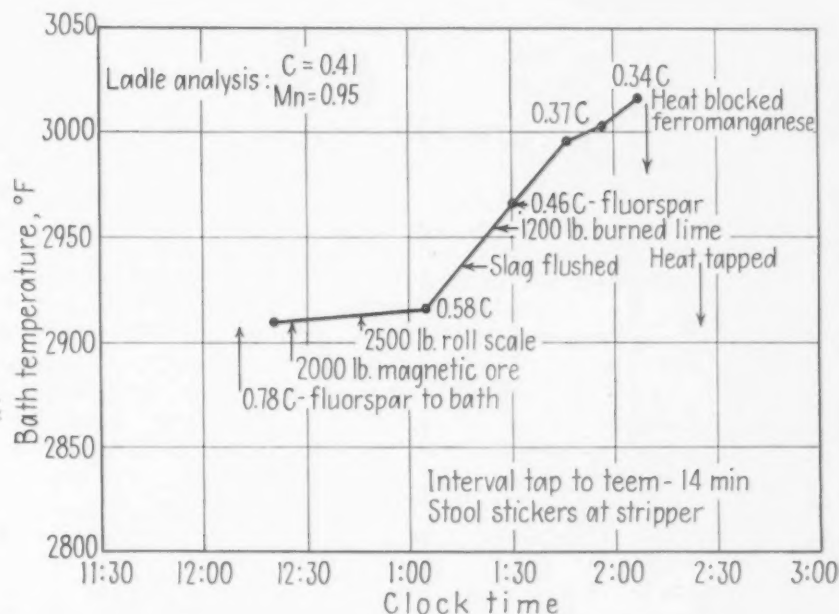
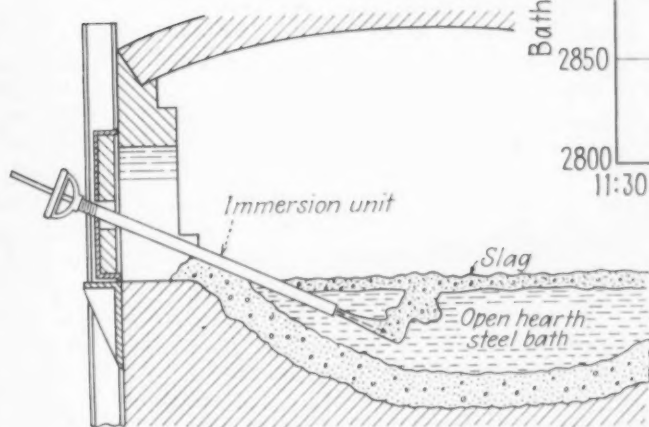
Improved Technique for Bath Temperature Measurement

IN A paper entitled "A Radiation Pyrometer for Openhearth Bath Measurements," H. T. Clark and S. Feigenbaum, assistant manager of research and development, and openhearth metallurgist, respectively, of Jones & Laughlin Steel Corp., emphasized the need for accurate temperature control in openhearth steelmaking. The paper, presented at a session of

mersed in them. Adequate protection of thermocouples, which of necessity must be brought to the temperature of the bath, has generally resulted in a large, heavy assembly made of brittle materials, unsuited for handling on the openhearth floor. The life of the equipment is short and maintenance has been an important consideration.

RIGHT
FIG. 2—Temperature-time data on a heat that teemed with ingot stickers.

BELOW
FIG. 1—Schematic diagram of pyrometer immersed in molten steel in furnace.



the Iron and Steel Division, stressed that poor temperature control may be costly to steelmaking operations and results in a lowered quality of the steel. Previous mill investigations of the effect of bath temperature upon steelmaking operations have been largely qualitative in character, based upon observations by practical melting personnel. The physical chemist has used the empirical information available and has reached reasonable and useful conclusions. However, use of a reliable direct-reading pyrometer would permit accurate quantitative evaluation of the effects of temperature and should furnish a more rational basis for study of the thermochemistry of steelmaking.

Considerable effort by a number of investigators has been directed to the development of a bath pyrometer that would be both accurate and practical for routine measurements. The surface of the molten metal is covered by several inches of slag which prevents direct observation of the metal surface for optical or radiation measurements. Both slag and metal are highly reactive at these temperatures and will attack to a greater or lesser extent any material im-

Any one of a number of physical properties of liquid steel could conceivably be used as a basis for temperature measurement. Efforts to the present time, however, have been confined largely to measuring either the thermal electromotive force generated between two dissimilar materials immersed in the steel or the intensity of radiation from the surface of the steel. These employ respectively one of the various forms of thermocouple or some type of radiation-measuring device such as an optical pyrometer, photoelectric cell or thermocouple radiation pickup element. Radiation methods include as a measuring device the optical pyrometer which is found in practically every openhearth shop. Investigators report that only a small correction is required to make the results comparable to platinum thermocouple readings, when the optical pyrometer is sighted on the bright areas of the stream of molten metal. Various modifications using an optical pyrometer, a photoelectric cell or a total radiation element have been suggested to make possible temperature measurements of the molten metal itself in the openhearth furnace.

One of these modifications is the open-end tube, immersion pyrometer which is described in this paper. The manner in which this open-end tube pyrometer is used is illustrated in fig. 1. The steel tube, with an orifice in the front end, is thrust through the slag into the liquid steel. A continuous flow of air keeps the molten slag and metal from entering the tube and opens up a cavity into which the radiation-sensitive

device is sighted. Used originally with an optical pyrometer sighted through a glass window at the rear end of the tube, it was later adapted to operate with pickup elements, the outputs of which could be permanently recorded. This paper describes a modified form of the pyrometer, using a total radiation element that has performed satisfactorily in extended tests. The open-end tube pyrometer has several features that make it particularly attractive as a means of measuring liquid steel temperature. Unlike the thermocouple, no part of the pyrometer attains the temperature of the steel. This simplifies the design since refractory materials are not required and the maintenance problem is materially lessened. The choice of a suitable radiation element is dictated by requirements of mechanical ruggedness and electrical and thermal stability. Temperatures obtained are those of the steel rather than of the slag surface or backwall of the furnace and may be readily charted.

The equipment was set up at the Aliquippa plant of Jones & Laughlin and a series of readings taken. A high speed recorder, the Speedomax, was substituted for the standard recorder in order to decrease to a minimum the time of immersion necessary to obtain a flat-topped temperature record. The Speedomax reaches a steady state more rapidly than the standard Rayotube when the latter is exposed suddenly to a constant source of radiation. Attention was therefore directed to making the Rayotube as fast as is consistent with ruggedness and reproducibility of readings. Speed of response is extremely important since excessive heating of the tube may result from even a few additional seconds immersion. Important also for reproducibility of readings was the arrangement of the Rayotube in the immersion unit to prevent errors due to (1) a gradual change in the size of the outer orifice, (2) occasional freezing of steel around its periphery or (3) any slight shift in the position of the Rayotube relative to the outer orifice.

An improvement of a major nature was the change in location of the Rayotube from the rear of the immersion tube to a position within a few inches of the front orifice. This improves the reliability of the readings and gives a faster response.

The pyrometer assembly consists of the immersion unit, the checking unit with built-in galvanometer, the recorder and an air-flow regulator and air filter. The immersion unit houses the Rayotube assembly and is made up of a 7-ft length of pipe, fitted on the one end with a $\frac{5}{8}$ -in. orifice and on the other with a head

containing the necessary control equipment. The output of the Rayotube is regulated by means of a potentiometer dial in the head and this is adjusted during the checking operation to obtain a null galvanometer reading. The Rayotube is mounted inside a double-walled pipe about 10 in. long for protection from radiation and mechanical damage. The arrangement used places the sensitive element of the Rayotube less than 13 in. from the molten steel and permits the use of a solid angle of 17° . The checking unit is similar in design to the immersion unit and the two units are so connected that the pyrometer can be checked at the back-wall or flame temperature, a temperature which quite closely approximates the temperature of the molten steel.

Much of the development work on this instrument has been done on tilting, basic openhearth furnaces producing a high proportion of duplex heats for which the refining period is relatively short. The temperature of the Rayotube rises to about 175°F immediately following a normal immersion. A comparison of check readings taken when the pyrometer is warm and after it has cooled to room temperature indicates that variations in temperature of the radiation element do not affect the values obtained for the bath temperature.

It is recognized that the temperature may vary considerably in different parts of the bath; this is particularly true of a quiet bath in a large furnace. The present design of pyrometer is not suitable for exploring the conditions within a furnace, but, if desired the immersion unit could be lengthened for this purpose without affecting the basic dimensions. In actual practice, readings are taken at a standard location in the furnace. Also, the recorder can be adjusted so that the pyrometer will read correct temperatures for any given emissivity value, provided the temperature is established by an independent method.

As an illustration of the practical use of the pyrometer, fig. 2 presents graphically the bath temperatures taken during the refining of an intermediate carbon, killed steel. The final readings indicated that the temperature of the steel was excessive, verified by the occurrence of stool stickers even though the heat was held in the ladle for 14 min.

Extensive mill tests indicate that the radiation pyrometer offers distinct advantages with respect to ease of operation, maintenance and reliability, and is a practical pyrometer for measuring bath temperatures in the openhearth furnace.

Machinable Permanent Magnet Material

A NEW development in permanent-magnet alloys was discussed by E. A. Nesbitt of the Bell Telephone Laboratories in a paper entitled "Vicalloy—A Workable Alloy for Permanent Magnets," presented at a general session of the Iron and Steel Division.

In recent years the trend has been to develop materials substantially free of carbon for use as permanent magnets. Remalloy (an alloy of iron, cobalt, and molybdenum), the various iron-nickel-aluminum alloys of the Mishima type, and the recent Alnico V are a few examples of these materials, in which the

best properties are developed by heat treating in the magnetic field, the author pointed out. However, the Mishima and the Alnico types of alloys are very brittle and after casting must be ground to size.

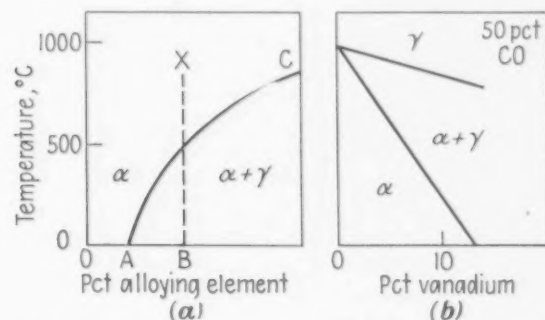
A permanent-magnet material—called Vicalloy—has been developed, Mr. Nesbitt said, which can be machined as cast and when handled with some care can be rolled to thin sheet and drawn to fine wire. Optimum magnetic properties are developed by a simple heat treatment, and at this time the ductility of the alloy disappears. If the cast alloy is heat-treated without

cold-working the magnetic energy product is about 1.0×10^6 . This material is called Vicalloy I, the preferred composition of which is 38.5 pct iron, 52 pct cobalt and 9.5 pct vanadium. When the alloy has been hot-worked and then cold-worked by swaging, drawing or grooved rolling, the magnetic energy product is increased to 2.0 to 3.5×10^6 , and in this state is called Vicalloy II, the preferred composition of which is 35 pct iron, 52 pct cobalt and 13 pct vanadium.

The behavior of Vicalloy may be better understood by contrasting the constitution diagram of the iron-cobalt-vanadium system with the diagram of some other system such as iron-molybdenum, the latter being considered typical of an age-hardenable alloy used as a permanent magnet. As shown in fig. 3 (a) an alloy of composition X must be quenched from some temperature above the solubility curve AC to maintain all the high-temperature alpha phase on cooling to room temperature. At room temperature it is then in

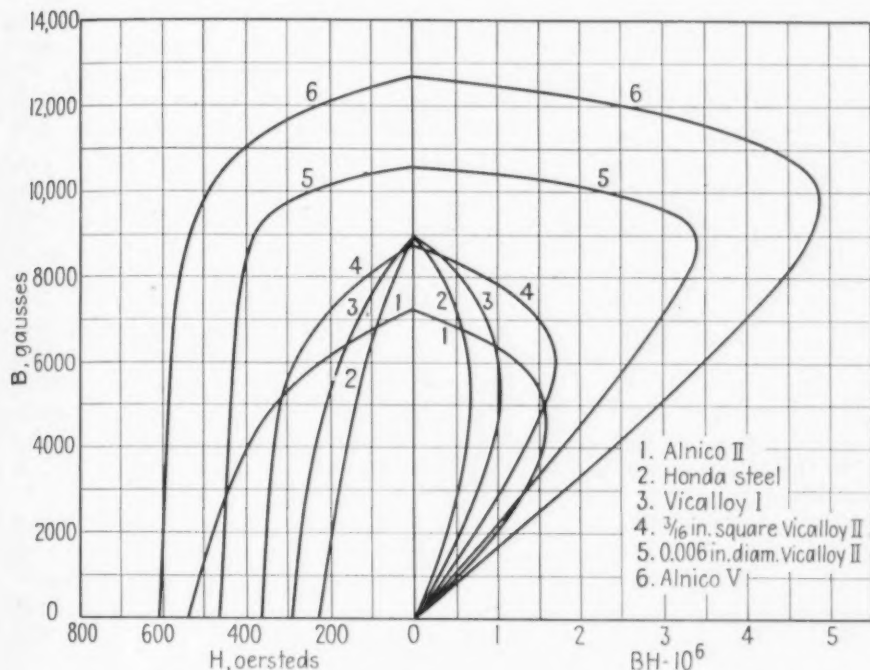
coercive force, H_c , of 300 oersteds, and (3) a flux density, B , of 16,160 gaussses at $H=1735$.

The values of B_c and H_c change very little whether the material is cooled slowly or rapidly from the heat-treating temperature. Because the alloy can be cooled slowly as part of its heat treatment, pole tips made from soft material (usually slowly cooled) may be



ABOVE
FIG. 3—Comparison of typical phase diagram (a) for dispersion-hardening permanent-magnet alloys with that for Vicalloy (b).

LEFT
FIG. 4—Comparison of Vicalloy with commercial permanent alloys.



1. Alnico II
2. Honda steel
3. Vicalloy I
4. $\frac{3}{16}$ in. square Vicalloy II
5. 0.006 in. diam. Vicalloy II
6. Alnico V

a supersaturated condition. For best permanent magnet properties, the alloy is raised to an intermediate temperature below the solubility curve and a small quantity of the low-temperature gamma phase precipitates. The alloy then consists of a small amount of the low-temperature phase dispersed in a matrix of the high-temperature phase.

According to fig. 3 (b) a diagram for iron-cobalt-vanadium alloys, when an alloy of 9.5 pct vanadium is in equilibrium at room temperature, it consists entirely of the low-temperature phase. High coercive force can be produced by raising the temperature of the alloy to the two-phase region (about 1100°F) and holding there for an hour or more. This permits a small amount of the high-temperature gamma phase to disperse in a large amount of the low-temperature alpha phase. This situation is thus the reverse of that in the iron-molybdenum system.

The optimum magnetic properties found on a heat-treated $\frac{3}{4}$ -in. bar of Vicalloy composition were (1) a residual induction, B_r , of 9000 gaussses, and (2) a

welded to the magnet and the magnet and pole pieces may be heat treated together. Thus the usual deleterious effects of welding pole tips to magnet after heat treatment are avoided.

Fig. 4 gives a comparison between the Vicalloy and other permanent-magnet materials. Although the Vicalloy II alloys do not show as high an energy product as does Alnico V, the usefulness of the Vicalloy alloys rests on their superior combination of magnetic and mechanical properties.

EXPERIENCE has indicated that hard bronzes are not suitable for bearing applications where high bearing loads and speeds are involved. It is the general practice to utilize softer materials for these purposes, such as copper, lead, silver, babbitt, lead-base alloys, and more recently aluminum-base alloys, preferably supported by a steel backing. In a paper entitled "Silicide-hardened Copper Compacts for Bearings," F. R. Hensel, consulting engineer, E. I. Larsen and E. F. Swazy of the metallurgical departments P. R. Mallory & Co., Inc., outlined an investigation of

TABLE I
Tensile Properties After Heat Treatment

Sample No.*	Specimen No.	Proportional Limit, Psi	Elastic Limit, Psi	Ult. Tensile Strength, Psi	Elongation, Pct per In.	Reduction Area, Pct	Density, G per cc
D-1205-C	1	14,400	28,800	49,200	0.977	0.227	7.96
D-1205-C	2	16,700	34,100	50,900	1.37	0.687	7.74
D-1206-C	5	13,100	38,100	55,600	1.37	0.228	8.34
D-1205-E	3	7,900	36,700	61,500	2.34	1.14	8.28
D-1205-E	4	9,200	28,800	52,250	0.78	0.228	8.44

* D-1205-C and D-1206-C, sintered, water-quenched from 1530° F, aged 5 hr at 840° F. D-1205-E, sintered, repressed, water-quenched from 1530° F, aged 5 hr at 840° F.

a new material produced by powder metallurgical methods, a material susceptible to precipitation-hardening. The paper was read at the powder metallurgy symposium conducted by the Institute of Metals Division.

The composition of compact used by the authors was 2.4 pct nickel, 0.8 pct silicon, 0.3 pct phosphorus, balance copper. Several methods of incorporating the hardening agent (nickel silicide) were studied, and it was found that compacts formed from copper, nickel and silicon powders were inferior to those fabricated from prealloyed nickel silicide master alloys because of the rapid oxidation of pure silicon during sintering. Best results were obtained by preparing a master alloy, having the nominal composition; 25 pct nickel, 7 pct silicon, 3 pct phosphorus and 64 pct copper. This alloy is brittle in the cast condition and can be readily powdered.

The blended powders were pressed at 25 to 40 tons psi, and sintered in hydrogen or cracked ammonia atmospheres at temperatures of 1830 to 1900° F for about 1 hr. Optimum properties were obtained with the following heat treatment: (1) water quench from 1530° F after soaking in nonoxidizing atmosphere for 30 to 60 min, and (2) aging for 4 to 6 hr at 840° F in air.

A microscopic examination of a sample after press-

ing and sintering showed the presence of free nickel silicide in the grain boundaries and precipitated within the grains. The heat treatment and quench was effective in diffusing much of the free nickel silicide into solid solution, while aging caused submicroscopic precipitation of this hardening agent within the grains (as evidenced by the uniform darkening of the grains).

The tensile properties after heat treatment are listed in table I. Compression strength tests were carried out with the use of special equipment to eliminate all nonaxial loads—a series of test runs indicated that the modulus of elasticity in compression varies directly with the density.

Fatigue tests most strongly emphasized the improvements made by the use of prealloyed powders. The S-N curve for heat treated compacts made from a mixture of copper, nickel, silicon and phosphorus copper powders showed an endurance limit of about 10,000 psi, while the S-N curve for heat treated compacts made from copper and prealloyed powders showed an endurance limit of about 17,500 psi. Amsler seizure tests indicated that the material was considerably more resistant to seizure than such alloys as copper-lead or tin bronzes. Further, when submitted to a bearing test of considerable severity, the material performed very well. There were no signs of metal to metal contact on the bearings and the shaft too (SAE 1045 hardened to 45 Rc) was in excellent condition.

o o o

TABLE II
Comparison of Mechanical Properties of SAE and Sintered Steels

Treatment ↓		1020		1040		1060		1080	
		SAE	Sin.	SAE	Sin.	SAE	Sin.	SAE	Sin.
Furnace Cooled**	Y.P.*	43	37	52	40	59	42	62	57
	T.S.*	66	55	88	61	95	69	102	79
	El., Pct	35	25	29	21	24	13.5	20	7.5
	R.A., Pct	55	27	60	22	51	12.5	48	5.5
Oil Quench, Drawn 1300° F.	Y.P.*	38	35	55	39	72	44	80	50
	T.S.*	60	52	82	55	98	63	100	69
	El., Pct	35	35	30	30	26	18.5	23	10.5
	R.A., Pct	65	40	60	35	61	22	56	10.5
Oil Quench, Drawn 800° F.	Y.P.*	57	50	76	55	105	65	125	80
	T.S.*	77	65	110	76	144	91	175	106
	El., Pct	30	25	19	18	17	13.5	12	8
	R.A., Pct	58	25	48	19	48	12	40	6.5
Water Quench, Drawn 600° F.	Y.P.*	80	60	95	82	.....	110	140	129
	T.S.*	98	75	125	102	.....	133	200	148
	El., Pct	15	15	11	10.5	.....	7.5	12	5
	R.A., Pct	45	23	42	14.5	.....	8	33	4

* Y.P. and T.S. values x 10³.

** More closely approaches air cool.

A STEP taken by the powder metallurgist to invade the steelmaking field was reported by G. Stern, metallurgist, American Electro Metal Corp., in another paper presented at the powder metallurgy session of the Institute of Metals Division. The paper was entitled "A Study of the Physical Properties and Microstructure of Sintered Steel." The method followed in this study consists of pressing and sintering an intimate mixture of iron powder and graphite in a suitable atmosphere to produce a steel.

In order to obtain the best possible results an electrolytic powder called Lectrofer and Dixon Crucible Graphite No. 8485 were used. Four mixtures were studied, containing 0.40, 0.65, 0.85 and 1.05 pct by weight of graphite respectively. The powder was weighed out and tumbled for 1 hr for each mixture. No lubricant was added to the powder mixtures as the die walls were thoroughly painted with a solution of Sterotex in acetone. Preliminary tests indicated that the following processing schedule was most satisfactory:

Press—50 tons psi
 Presinter—2000°F for 15 min
 Repress—50 tons psi
 Resinter—2000°F for 1 hr

To overcome the decarburizing problem, a cracked propane atmosphere was used with a ratio of 80 cu ft per hr of air to 10 cu ft per hr propane and lithium salts was placed on the boat carrying the charge, as well as in the lithium generator.

Table II illustrates the physical properties obtained from heat treated sintered steels as compared with commercial SAE steels. The results obtained indicated that steels made from electrolytic iron and graphite powders can be treated to give yield strengths and tensile strengths reasonably close to those of plain carbon SAE steels. The values for sintered steels deviated from those of the SAE steels in the higher carbon ranges. The elongation values for the sintered steels approach the values obtained with plain carbon SAE steels for the low and medium carbon range (0.28 to 0.52 pct C), while in the higher carbon range (0.64 to 0.87 pct C) the elongation values for sintered steels

drop to about one-half or less of the corresponding values for SAE steels. These results are believed due to the increased porosity of the sintered steels as the carbon content was increased. This increase in porosity which varied from 3.8 pct for the 0.40 pct graphite material to 6.1 pct for the 1.05 pct steel, is due to the increased resistance to deformation after presintering as the carbon content is increased. The porosity also results in low values for reduction of area, impact and hardness.

The microstructure of the sintered steels is equivalent to that of similarly heat-treated SAE plain carbon steels. The main differences are the greater porosity and a slight tendency toward abnormality in the samples slowly cooled from the sintering temperature. This abnormality is in the form of coarse pearlite with an occasional isolated individual lamella due to the high purity of the steel.

Several grades of reduced iron powder were investigated in combination with graphite. The results on all types investigated were far inferior to those obtained with electrolytic iron plus graphite.

Copper-Base Compacts for Electrical Industry

HIGH strength, high conductivity copper-base alloys have found considerable use in the resistance welding and electrical industry in the form of castings, forgings or wrought products. There are a number of parts utilized by these industries which would lend themselves to manufacture by powder metallurgical methods provided the required physical and electrical properties are obtainable with such methods.

The results of a study of certain copper-base powder metallurgical products susceptible to precipitation hardening were presented in a paper entitled "Notes on Copper-Base Compacts and Certain Compositions Susceptible to Precipitation Hardening" by F. R. Hensel, consulting engineer, E. I. Larsen and E. F. Swazy, metallurgical department, P. R. Mallory and Co., Inc., Indianapolis.

A series of compositions, listed in Table III, was

studied to investigate the susceptibility of precipitation hardening copper-base compacts to heat treating after pressing, sintering and repressing. Mixtures of the metal powders were made in the proportions shown in the table, and blended in a ball mill for 8 hr. The physical and electrical properties of the alloys are also listed in Table III; tensile tests were conducted on standard 0.505-in. diam specimens machined from compacts. Tensile data were determined only on the more promising alloy compositions. Manganese-phosphorous and nickel-tin additions to copper did not produce appreciable precipitation hardening effects; promising results were obtained with the addition of nickel-phosphorous, chromium, cobalt-phosphorous, and the nickel-beryllium and cobalt-beryllium alloy powders. A Krouse rotating beam fatigue test conducted on alloy L-1511 indicated an endurance limit of 20,000 psi.

TABLE III
Copper-Base Alloy Compositions and Physical Properties

Sample Number	Nickel	Chromium	Phosphorus	Beryllium	Other	Ultimate Tensile Strength, Psi	Elongation, Pct in 2 in.	Electrical Conductivity as Solution Treated, Pct I.A.C.S.	Electrical Conductivity after Aging, Pct I.A.C.S.	Hardness as Repressed, Rockwell	Hardness as Solution Treated, Rockwell	Hardness as Aged, Rockwell
L-1503	1.00		0.25					22.3	30.0	22-B	25-F	20-B
L-1504	2.00		0.50			45,000	4	21.0	40.0	19-B	36-F	53-B
L-1505			0.25		0.75 Mn			24.4	44.1	33-B	45-F	14-B
L-1506			0.15		0.50 Mn			32.2	55.6	44-B	26-F	44-F
L-1507	4.00				4.00 Sn			11.7	12.8	42-B	30-B	35-B
L-1508	5.00				8.00 Sn			7.25	8.4	46-B	15-B	40-B
L-1509		3.00	0.50								38-F	53-F
L-1510		3.00	0.10			48,000	7	32.2	64.3	35-B	38-F	51-B
L-1511		3.00	0.10		0.5 TiH ₂	52,000	8	33.5	69.1	38-B	42-F	68-B
L-1512			0.50		2.0 Co	36,500	15	28.5	43.4	30-B	28-F	39-B
L-1271 ^a	2.5			0.5		52,000	7		61.0	35-B		72-B
L-1271-A ^a	2.5			0.5		39,400	5		52.0	35-B		60-B
L-1272	3.00			0.5	0.5 Si	61,200	2.5		35.5	35-B		80-B
L-1293 ^a				0.5	2.5 Co	78,200	3.1		41.0	35-B		85-B

^a Prealloyed powders of cobalt and beryllium, or nickel and beryllium used.

Fabrication and Properties of Ductile Titanium

TWO papers were presented at a session held by the Institute of Metals dealing with ductile titanium. The papers covered investigations undertaken by the Bureau of Mines of methods for producing metallic titanium and its amenability to various types of fabrication and the properties that might be realized through such fabrication. The titles of the two papers were "Preparation and Properties of Ductile Titanium," by R. S. Dean, J. R. Long, F. S. Wartman and E. L. Anderson, and "Ductile Titanium—Its Fabrication and Physical Properties," by R. S. Dean, J. R. Long, F. S. Wartman and E. T. Hayes. The authors of both papers are all associated with the Bureau of Mines.

Emphasizing that titanium ranks fourth in abundance among the earth's metallic elements suitable for engineering purposes, the authors of the former paper said that commercial use of this element has been limited largely to the chemical industries and to the production of paints and pigments. The absence of structural applications was felt to be due to the difficulty experienced in preparing pure ductile metal.

Pure titanium metal was said to be a ductile metal and the presence of small amounts of impurities is believed to have been responsible for earlier reports of brittleness. Heated titanium reacts chemically with various gases, such as hydrogen, oxygen and nitrogen and the principal difficulty in producing ductile titanium is the prevention of contamination by these gases.

The laboratory investigations resulted in the successful production of 15-lb batches of titanium powder without encountering technical problems which might militate against expansion of the process to larger scale operations.

Briefly, the process used consists of the reduction of $TiCl_4$ with magnesium at a temperature of about 1470°F. The reaction mixture of titanium, magnesium chloride, and the unreacted magnesium, after cooling, is crushed and leached. The resulting granular titanium is ground wet, leached to remove the magnesium, dried and consolidated by powder metallurgy methods.

The resultant powder has a high purity, containing about 25cc hydrogen per g of metal and 0.50 pct Mg, both of which are completely removed by sintering at

1830°F in high vacuum. Silicon is believed to be less than 0.1 pct.

This powder was consolidated by pressing into compacts at a pressure of 100,000 psi and sintering at 1830°F in a vacuum of 1×10^{-4} mm Hg. It was felt that the commercial possibilities of titanium could be more practically achieved through powder metallurgy than by melting and casting because titanium in the molten state reacts with virtually everything it comes in contact with.

The sintered compacts were reported to be ductile, to lend themselves readily to cold deformation and were made into sheet and bar form by normal fabricating methods. The annealed material showed a tensile strength of about 82,000 psi, with 28 pct elongation and a hardness of RA 55. The metal is hardened by cold working, tensile strength for 50 pct reduction by cold working being about 126,000 psi, with 4 pct elongation and a hardness of RA 65. This metal was said to have excellent corrosion resistance, being similar to stainless 18-8 in this respect. While in finely divided form titanium is pyrophoric, the —35 mesh powder used in these investigations was said to be quite stable. The compacted material may be heated to at least 1470°F in air without taking fire.

The second paper reported on some compacts which had been fabricated into 1/16-in. sheet, 3/8-in. cold swaged bars and 0.02-in. diam wire. Rods, it was reported, could be drawn down to wire as fine as 0.006 in., although this wire had 15 intermediate air annealings without removal of oxide film.

The sintered compacts are best worked by cold forging and can be reduced as much as 50 pct in thickness in this operation. Compacts were normally forged to 25 pct reduction and in this condition had a tensile strength of 115,000 psi, a density of 4.42, 6 pct elongation and a hardness of RG 81. Vacuum annealing at 1830°F gave a small increase in density, but reduced strength and hardness to about that of the sintered compact.

These forged and annealed compacts were cold rolled by slight reductions and many passes, with intermediate annealing after 15 to 20 pct reduction and finished into sheet with 10 to 60 pct reductions. Table IV lists physical properties for 1/16-in. sheets in the cold-worked and annealed state.

TABLE IV
Tensile Properties of Cold-worked and Annealed 1/16-inch Titanium Sheet

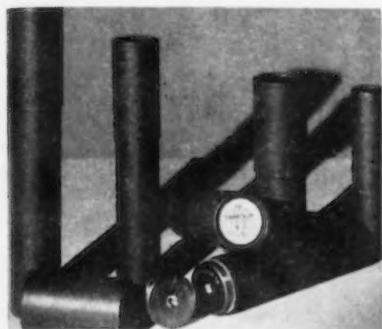
Annealing Temp. °C	Ultimate Strength, Psi	Yield Strength, 0.2 Offset, Psi	Proportional Limit, Psi	Elongation, Pct in 2 in.	Hardness, R _G	Grain Size, mm
400	99,200	92,100	76,500	15.3	87	.....
500	90,700	81,300	71,100	18.5	87	.....
600	82,100	69,400	63,400	22.9	79	.....
700	79,000	64,700	59,500	25.2	78	0.025
800	79,100	64,000	58,800	24.7	76	0.035
900	78,500	65,000	58,000	23.8	77	0.045
1000	80,500	64,500	44,800	22.5	67	0.045
1100	81,500	65,400	41,100	21.5	68	0.090

New Equipment...

Small Tools

... Various developments of general utility in all types of small tools including indexing features, explosive rivet irons, fluid-motion dressers, blade holders, deburring tools, twist drills, speed chucks, optical flats, soft hammers, live centers, hand tachometers and many other devices are described in this week's digest of manufacturers' announcements.

ALL dies from R-1 through R-5 as stock items in quantities of ten in strong cardboard cylinders having a waxed interlining which effectively protects the dies from



moisture, are now being packaged, by the *Carboloy Co., Inc.*, Detroit. A sticker on the lid of each carton carries such pertinent information as nib size, casing size, and hole size of the dies. Packaging dies in these cases in quantities of ten, it is said, not only shortens the time required to fill orders for standard dies in the smaller sizes and insures stock arriving in first class condition, but also adds to the neatness of the user's stock room and materially speeds up spot inventories. There are several sizes of these specially designed cartons to accommodate the various standard wire drawing dies.

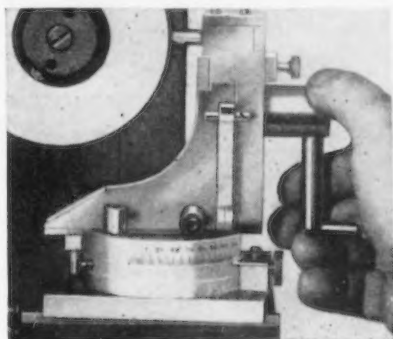
Indexing Feature

AN improvement in the method of indexing with the *Quadrill*, has been announced by the *Chicago Drillet Corp.*, 920 S. Michigan Ave., Chicago 5. It is claimed by the manufacturer, that this indexing device provides a fool-proof arrangement that will permit even the most inexperienced operator to

speed up indexing and avoid error. It is further said that the device is built to the same precision standards as the *Quadrill* itself, and that it has a unique, positive, quick-looking action that will simplify indexing in all drill press operations.

Fluid-Motion Dressers

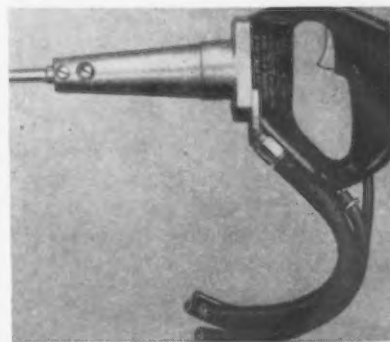
ADDED to their line of fluid-motion series of J & S Radii and Angle Dressers is the model F, announced by *J&S Tool Co.*, 477 Main St., E. Orange, N. J. Although this model embodies the features of the larger model E, it is said to complement the uses of the larger model, rather than being merely a smaller edition. The model F is adapted for cylindrical grinders with spindle heights as low as 5 in. from the base of the table and



accommodates wheel diameters up to 7 in. Its compact size is suited to internal grinders with wheel diameter under 7 in., and when form-dressing on small bench-surface grinders, this model is claimed to handle a variety of applications. It has a 7-in. wheel capacity and radii range to 1½ in., but is only 5⅝-in. high, with a 5-in. diamond-point height and a base of only 3 3/16 x 4 in.

Explosive Rivet Iron

ACQUISITION of all Goodyear rights to the low voltage riveting iron used for setting DuPont explosive rivets which are



widely used in blind applications and hard-to-reach places has been announced by *The Ripley Co.*, Torrington, Conn. This No. 6 iron is designed so that upon the pressure of a trigger electric current instantly produces intensive heat at the point of contact with the rivet head. The head detonates the expansion charge within the rivet shank and sets it, forming a strong, tight joint.

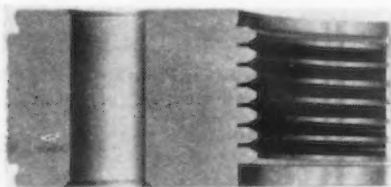
Buffing & Polishing Machine

THE type LBVB infinitely variable speed buffing and polishing machine has been announced by *The Standard Electrical Tool Co.*, 2505 River Rd., Cincinnati 4. This machine is powered by a 1 hp motor and operated by toggle switch, and through the Speedial-control located at front of machine it is possible to obtain any spindle speed variation between 1500 and 3000 rpm. This unit will serve in the production of small parts for either buffing or pol-

ishing at the correct spindle speed and furthermore, as wheels wear, the spindle speed may be increased for maintaining the correct peripheral speed.

Thread Gages

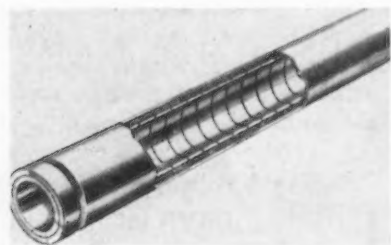
Thread gages with clearance below the roots of the threads, making it possible to set down or



adjust the gages to take full advantage of the adjustment provided in ring gages, has been announced by *Locke Gage Co.*, 10232 Woodward Ave., Detroit 2. The crest of the set plug will not contact the root diameter. Through this clearance it is now possible to lap the entire side of each thread from crest to root, as the thread lap extends into the clearance. This is said to permit reconditioning of each gage far beyond its original life span. The clearance also serves as a receptacle for foreign particles which otherwise might become wedged in between the mating surfaces.

Silent Stock Tube

A silent stock tube for use on both single and multiple-spindle automatic screw machines, has been announced by the *Corlett-Turner Co.*, 4011 W. Lake St., Chicago. Outstanding feature of this tube is that it eliminates the terrific clatter caused by revolving bar



stock. In construction it consists of a helically wound, wear resistant steel liner, which is covered by sound absorbent material, and encased in a steel tube to form a compact rigid, and efficient silent stock tube. It is made in 18 standard sizes ranging from a bar capacity of $\frac{1}{2}$ to $2\frac{3}{8}$ in., and in addition, for some multiple spindle machines, special size tubes are available.

Electrolimit Comparator

FOR checking balls, the model CE-699 Electrolimit external comparator has been announced by *Pratt & Whitney, Div. Niles-Bement-Pond Co.*, W. Hartford, Conn. This comparator is equipped with a special gaging spindle, anvil and backstop, making it ideally suited for the inspection of balls. The gaging spindle and anvil are identical pieces having a T-C gaging tip with 0.020-in. radius. The backstop is a tungsten carbide v located in the anvil fixture with provision for both vertical and horizontal adjustment.



Metal Disintegrator

An improved type of metal disintegrator which safely removes broken taps and drills from work in progress, has been announced by *Drafto Corp.*, Cochranton, Pa. Known as the model 3 Drafto metal disintegrator, this machine works on the electrical sputtering principle, and is said to be a fast machine for drilling hard metals. It will remove broken drills or taps from work without in any way injuring the metal of the workpiece, and regardless of the hardness of the metal. This machine is not only a tap remover, but can be used as a drill. It will drill round holes or holes of practically any shape through tungsten carbide and stellite, and will cut virtually all hard metallic materials. Three models of the machine are available, models A and B are floor models;

are completely self-contained, and can be rolled to any part of the plant for use. Model C is a compact



portable table or bench model, consisting of controls, transformer, coolant tank, pump and working head in one sturdy unit.

Pneumatic Tool

A bench mounted, pneumatic Hypress for installing Hydent (indent-type) connectors on small electrical wire and cable has been announced by *Burndy Engineering Co., Inc.*, New York 54. The complete connection is said to be made in one quick, automatically controlled stroke of the press which indents the connector onto the wire at the same time the insulation grip is closed. High-speed production is



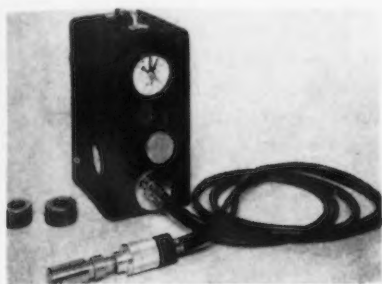
said to be the principal feature of this tool. Connections can be made just as rapidly as the operator can slip the connector on the end of the wire and lay the assembly in the holding die. Another advantage is that a single pair of dies accommodates three connector sizes. The dies now available will take Hydent

NEW EQUIPMENT

connectors No. 18, 14 and 10, which means that connections may be made on wire and cable sizes from No. 22 to 10, inclusive.

Comparator

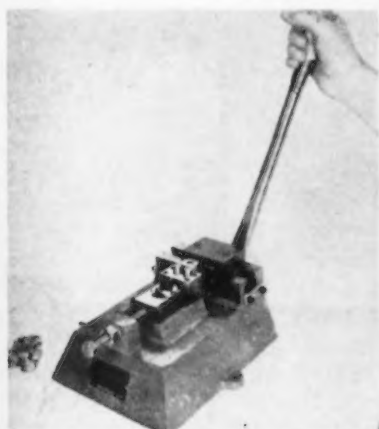
TO enable hand gaging to be accomplished at a distance from the comparator, *Pratt & Whitney, Div. Niles-Bement-Pond Co.*, W. Hartford, Conn., has announced the model R2 Air-O-Limit comparator



with booster relay. This relay permits the use of any length hose between the gage cabinet and the gage plug without any loss of speed or accuracy in the gaging operation. When machine operations call for remote gaging, the booster relay will fill the requirements.

Bench Marking Machine

AN improved Acromark No. 924A hand-operated bench marking machine which is said to have a number of advantages and design improvements over the former model No. 924, has been announced by *The Acromark Co.*, Elizabeth 4, N. J. Construction has been simplified to give fewer moving parts and

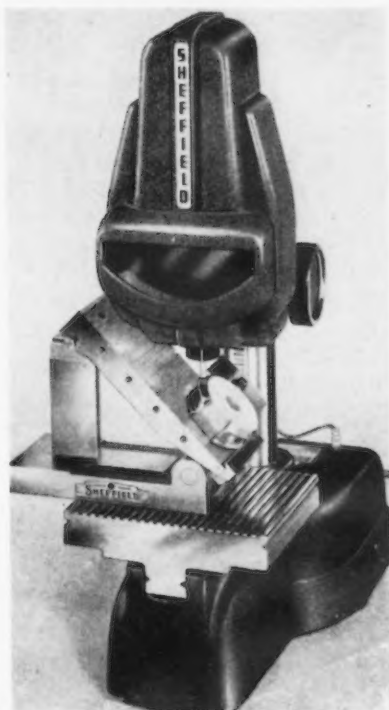


adjustments have been provided to compensate for wear of the marking head. It is claimed that the new style of nesting jig allows a variety of work to be marked and also simplifies the adjustment for depth of imprint. Jigs to locate individual pieces are easily attached to the

machine and can be released by removing a single capscrew which clamps the nest block between machined ways. This machine also provides die changing facility and both interchangeable type and solid logotype dies may be used individually or in combinations.

Line Bar Fixture

A DEVICE for checking tapered and angular work which requires a high degree of dimensional accuracy, the Sheffield sine bar fixture has been announced by *The Sheffield Corp.*, Dayton 1. It consists of a serrated work surface hinged to a base plate, the entire

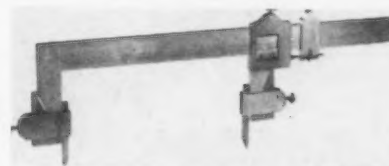


fixture being precision made to a tolerance of 0.0001 in. The work surface angle is set by using precision blocks as a reference. This fixture is available in two sizes, 5 and 10 in., respectively, between hinge center and setting bar center. The 5-in. fixture may be used on a Sheffield visual gage equipped with a 6-in. anvil. Either size fixture is suitable for use on a surface plate with a height gage.

Radii Attachments

RADII attachments for vernier calipers that are claimed to save time and increase accuracy in lay-out work, checking and measuring have been announced by *Modern Machine Tool Co.*, 7572 E. Robinwood, Detroit 12. The attachments are adapted for use in connection with the vernier caliper to

which they may be easily attached. A feature of the combined tool is that it may be set quickly and accurately to any desired dimension within 0.001 in. with a minimum loss of time. Another feature of the attachments is that by lowering one scriber and raising the other the tool may be advantageously used for measuring in hard-to-get-in places where micrometers or



vernier calipers without the attachments could not be used.

Blind Fastener

AN application for the Rivnut blind fastener on turbo superchargers for high altitude planes was made possible by the development of a special Rivnut of stainless steel, announced by *The B. F. Goodrich Co.*, Akron, Ohio. The problem solved was the fastening of a gas seal ring in the superchargers. This device as finally developed, can be upset on standard Rivnut tools with a change of pull-up studs and anvils.

Adjustable Compensator

AN adjustable Compensator has been announced by *Pratt & Whitney, Div. Niles-Bement-Pond*

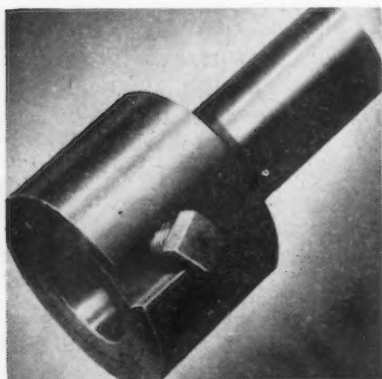


Co., W. Hartford, Conn., which can be readily attached to the comparator. This compensator is said to allow full scale graduations of 0.0004, 0.0006, 0.0008, and 0.001 in. to replace the full scales of 0.002, 0.003, and 0.004 in., that are normally used. It also offers greater

diametral clearance, better side compensation, longer wear life and greater speed at the higher magnification.

Tap Holder

A DRAW-OUT-STYLE tap holder has been announced by *Barnaby Mfg. & Tool Co.*, Bridgeport, Conn. Known as the Jam-Proof non-releasing tap holder, this tool is said to be of rugged construction and will monitor the severest tapping operations without sticking or jamming. A small amount of float is incorporated to correct for any slight misalignment in the machine, and two free-sliding cylindrical guide keys do much to assure trouble-free operation. The



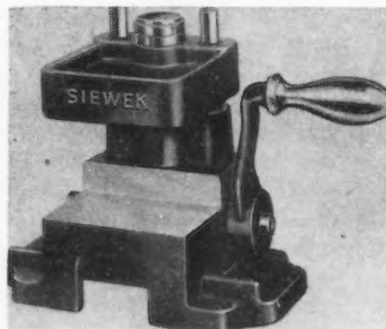
extra-heavy setscrew will, it is claimed, withstand long use without stripping, and all parts are precision-made and hardened for maximum service life. These tap holders are available in three sizes, with shank diameter of $\frac{5}{8}$, $\frac{3}{4}$ and 1 in.

Rapid Clamping Drill Jigs

TWO midget type clamping drill jigs to supplement their regular line of larger size standard jigs have been announced by *Siewek Tool Div. of Domestic Industries, Inc.*, Chicago. Made in two small sizes, they have work areas of $1\frac{1}{8}$ x 2 in. and $1\frac{1}{2}$ x 3 in. These midget-type jigs, both of the rack and pinion type, are designed for handling small jobs such as radio parts, electrical devices and instrument parts. Designed to operate in both a vertical and horizontal position, these jigs may be used either as a drill jig or as a rapid clamping vise for many operations. Although light in weight, these jigs are said not to release under chatter and to be free from back-lash.

Spring Jig

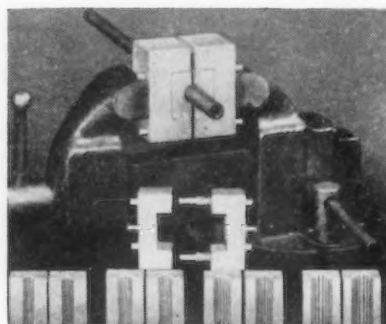
A MIDGET-TYPE spring jig has been announced by the *Siewek Tool Div. of Domestic Industries, Inc.*, Chicago. It is a small, lightweight jig used for handling small items including radio parts, elec-



trical devices and a large variety of other small parts. This jig is designated as No. 1500, and weighs only $6\frac{1}{2}$ lb. Other features include absence of backlash and provision for right and left hand operation. Spring tension is quickly adjusted by lock nuts at the head of the posts. This jig locks securely when the handle is down, quick release is provided for and plenty of room is allowed for chip clearance.

Pipe Gripping Device

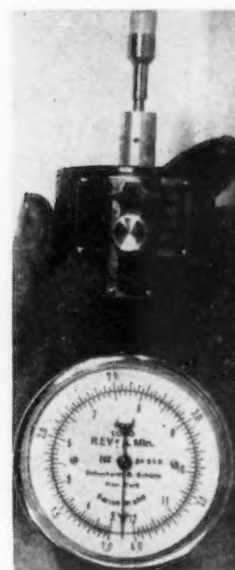
A HANDY pipe gripping device has been announced by *J. A. Campbell Co.*, 645 E. Wardlow Rd., Long Beach 7, Calif. It is so designed as to hold a small pipe in any vise without crushing or marring the surface or threads. This



device, known as the Nip-Grip, is said to permit fast handling of pipe without damage. It consists of two light alloy retainer blocks in which hardened steel inserts are slipped to hold various pipe sizes. Springs automatically spread the blocks apart when the vise is opened. It can be positioned horizontally or vertically and is held by pins.

Hand Tachometers

PRECISION hand tachometers to enable engineers to read the revolutions per minute of any revolving equipment, has been announced by *George Scherr Co., Inc.*, New York 12. These tachometers operate on the centrifugal principle, and have five speed ranges covering a wide range of speeds. The four models are: model A from 30 to 12,000 rpm, B from 45 to 18,000 rpm, C from 60 to 24,000 rpm and D from 120 to 48,000 rpm. It is thus possible to obtain the speed of generators, combustion engines, belts, elevators, transmission pul-



leys, power plants, textile machines, pumps and lathes. It is said that these tachometers gain their extreme precision from the fact that each dial is individually calibrated for each instrument.

Speed Chuck

AN air-operated collet-type speed chuck with characteristics similar to those of other Erickson precision collet chucks and expanding mandrels, has been announced by *Erickson Tools Div. of Erickson Steel Co.*, Cleveland. Its accuracy covers a range of $\frac{1}{32}$ in., thus eliminating the need for seven standard single-purpose collets. Available in either foot-valve or hand-operated models, and adaptable to any spindle, model 4AT has a range of $\frac{1}{8}$ to 1 in., and model 6AT has a range of 1 to 2 in. Claimed benefits of this air-operation speed chuck are speeded chucking operations, little maintenance required due to simplicity of design, and decreased fatigue.

Soft Hammers

TWO models of soft hammers in the light sledge weight range, have been announced by the *Gregory Tool & Mfg. Co.*, 5300 Tireman, Detroit 4. One has a replaceable copper or brass head, the other replaceable brass or copper tips. Each type comes in four sizes (diameter of head) 1 3/4, 2, 2 1/4 and 2 1/2 in. sizes, and weigh from 4 1/2 to 10 1/2 lb. Equipped with a safety leather washer handle this Perfect Balance soft hammer has been particularly designed for use in locomotive shops and for the assembly of heavy ma-



chinery in tool and die shops. This line of hammers consist of 12 different models and 56 different numbers, ranging in size from 3/4 to 2 1/2 in. and in weight from 3 1/2 oz to 10 1/2 lb. This is said to provide a soft hammer for light taps and controlled blows for every industrial, commercial and professional purpose.

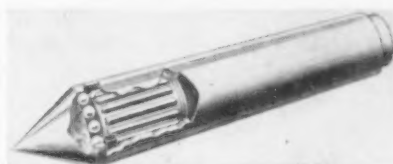
Speed Lathe

DESIGNED for speedy, economical general finishing operations on small metal and plastic parts, a small, light-duty speed lathe has been announced by *Schauer Machine Co.*, Cincinnati. Hand operating lever may be set on right or left hand side of the lathe and in either vertical or horizontal position. Only 5 lb pressure on the lever is required to open the collet. The motor is single-speed, 3450 rpm, 1/4 hp for 220 or 440 v, 60 cycle, 3 phase, and the machine is designed to use type 3C collet with maximum capacity for 1/2-in. round stock. It can also be equipped with

a 3-in., 3-jaw, light-duty chuck. A 1/2-in. clear hole through the spindle permits rod or bar stock or long work pieces to be handled.

Live Center

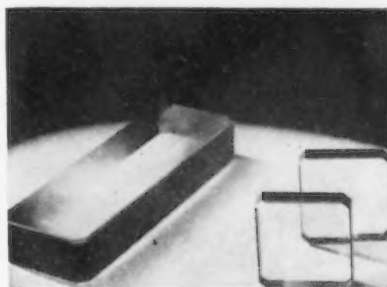
THE Star live center, announced by *Samuel S. Gelber Co.*, Chicago 6, is claimed to be sturdy and compact with no overhang, and hav-



ing the same general dimensions as a standard dead center. The spindle is said to be made of high grade alloy tool steel hardened to 64 Rc, then precision ground. The shank is hardened and ground both internal and external for perfect fit, and it also has ground thrust type ball bearings and ground radial roller bearings. The bearings turn on an antiscoring concentrated lubricant that withstands pressures greater than 50,000 psi.

Optical Flats

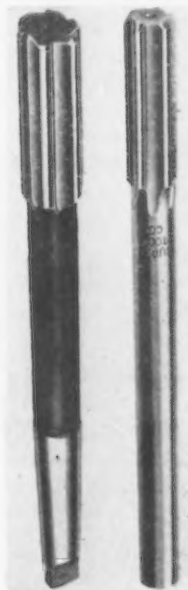
CHECKING of gage blocks, anvils, sealing surfaces, and other precision articles for flatness, size and parallelism is said to be made simpler, more accurate, and more convenient by the use of the square and rectangular optical flats, called Optron flats and announced



by *Optron Laboratory*, Salem Ave., Dayton 6. In addition, these flats are claimed to be more economical and easier to handle than those of the conventional round shape. The straight edges provide reference lines for comparison of straightness of interference bands, often making it unnecessary to use rules or straightedges, and removing another possible cause of scratching the fine surfaces.

Carbide Reamer

A CARBIDE tipped solid Reamer with the carbide tips extending the full length of the fluted section of the tool has been announced by *Super Tool Co.*, 21650 Hoover Rd., Detroit 13. This reamer is said to be effective in many ways, particularly through the virtual elimination of wear on the flutes back of the cutting section. Scoring or galling is reduced to the minimum, particularly when reaming in cast iron and other very abrasive materials. The efficiency of this tool is



reflected in better finishes, more holes per grind, as well as less time lost in the tool room for sharpening.

Diaphragm Chuck

A TOOL which increases production and reduces costs in secondary precision machining operations such as grinding, diamond boring and light turning, has been announced by *N. A. Woodworth Co.*, Detroit. This product is a Diaphragm Chuck, adaptable to various types of machine tools and can be actuated either manually or by air. Its construction and operation are simple, and it is supplied with or without a work shop. This chuck is suitable for rotating speeds up to 3600 rpm. The chuck is also said to be especially useful where thin walled sections must be machined as pressure exerted on the part can be adjusted to prevent collapsing of the walls. The chucks can be made to grip either on the inside or the outside diam of the part to be processed.

Blade Holder

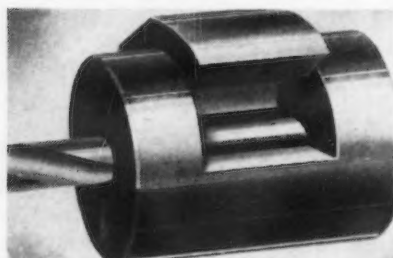
DESIGNED to cut down the discard of broken lengths of hack saw blades, the Super Blade Holder, which also accommodates thin flat file sections, has been announced by A. D. McBurney, 939 W. Sixth St., Los Angeles 14. It is a single unit tool composed of a tubular handle with an extended positive grip nose for securing the working point of



the blade or file. The ends of the handle are slotted to receive inserted blades, and any length blade can be held securely. In addition to saving expensive material, the holder is said to simplify many operations such as key-hole sawing and is suited for tool and die makers.

Hinged-Shoe Bushing

KNOwn as the Barnaby Hinged-Shoe Bushing, an improved tool holder bushing has been announced by Barnaby Mfg. & Tool Co., Bridgeport, Conn. These bushings have the clamping shoe fastened permanently to the body of the bushing by a hinge pin, and the shoe floats freely on the pin. Because of the construction, bothersome retaining rings and spring slips are eliminated. There is no possibility of the shoe becoming lost, or of using the wrong shoe; and there is no slipping of the bushing halves when clamped. It is said that these bushings permit faster, easier set-up wherever shoe-type



bushings are required. They are suitable for use in all drill holders, tap holders, knurl holders and floating holders, and can also be furnished either blank or finished as desired.

Deburring Tools

A NEW line of hand-forged deburring tools has been announced by Metal Products Co., South Bend, Ind. The line fea-

tures seven distinct types, each in varying sizes, with a view to furnishing the right tool for every hard-to-get-at deburring operation. These tools are suitable for nonferrous, hard metal work, or plastics, and make it unnecessary for manufacturers to produce their own deburring devices at needless time and expense. Hand-propelled, it is said they conveniently get into places that power or flexible-shaft tools cannot reach. The complete line is made of tool steel, unimpeded operating shafts from 4 1/4 to 9 in. in length, hollow-ground, hardened, and specially tempered.

Carboly Twist Drill

A CARBOLOY-TIPPED twist drill has been announced by Nelco Tool Co., Inc., Brooklyn. This drill is said to permit faster cutting of plastics, ceramics, cast iron and bronze. Unlike steel drills which

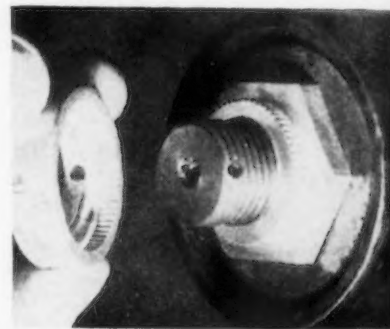


dull rapidly when used on such abrasive substances, this product is said to have an extremely long life. These drills can be used on glass and other materials which are too hard for steel drills. Although holes can be drilled in heat-treated steel, it is not recommended as a production job.

Adjustment Nut

THIS 60 station adjustment nut, announced by the E. S. Firestone Engineering Co., 11127 Magnolia Blvd., N. Hollywood, Calif., is said to permit precision setting

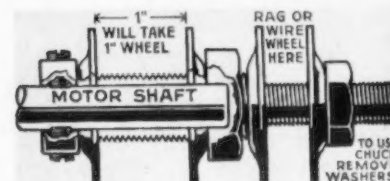
through the utilization of mating serrations which permit the nut to be set at exact tension and locked in position by the conventional cotter-key. It is claimed to be especially adaptable to securing proper spindle bearing adjustment to eliminate wheel wobble and achieve perfect wheel alignment. This nut is said to be especially suitable for airplane wing bolts, transmissions,



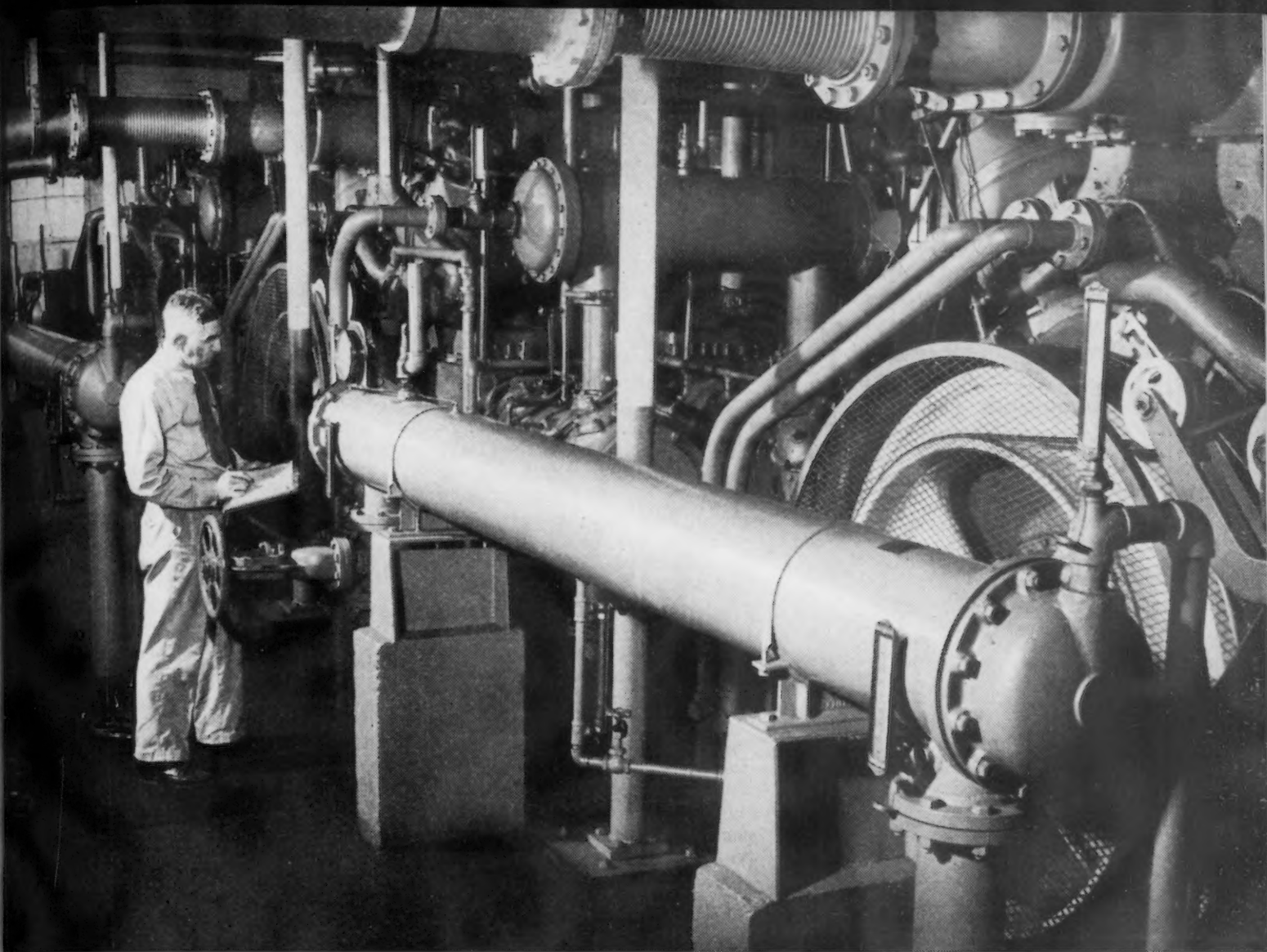
drive shafts, instruments and all high precision machinery where fine adjustments are required.

Combination Attachment

A COMBINATION attachment arbor for half-inch electric motor shafts has been announced by A. D. McBurney, 939 W. Sixth St., Los Angeles. The Super Arbor, No. 150, is designed to take grinding wheels with 3/4-in. holes on main shaft, or 1/2-in. holes on the small ends. The extension can be used for rag or wire wheels or for circular saw blades, and it also



holds 1/2-in. 24-thread drill chucks which in turn grip drills from No. 60 to those 1/2-in. in diam. The Super is said to have advantage over the ordinary arbor in that it fits well over and onto the main motor shaft. A 1-in. grinding wheel is thus mounted directly on the main shaft and not out on the arbor extension. This feature eliminates the possibility of whipping and dangerous disintegration of the grinding wheel.



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Keeps Three 400-h.p. V-Angle Compressors Going 24 Hours a Day

Here's a case where three, big, four-cylinder, Diesel-driven air-compressors, each delivering maximum capacity of air per minute under 100 pounds pressure, stayed on the job four years . . . and operated almost continuously 24 hours a day.

Lubricated with Sun compressor-oil, these units have had no lubrication problem. There has been no time-out for shutdowns, overhauls, or repairs due to failure of lubrication.

Records like this are being made every year in hundreds of plants by Sun products, refined to meet special industrial uses.

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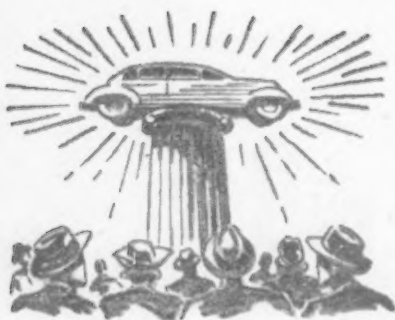
SUN
—**SUNOCO**—

**INDUSTRIAL
PRODUCTS**

Assembly Line

STANLEY H. BRAMS

• Ford's new contract with UAW sets up good standards of values in relationships between management and labor. . . . New AMA era begins with election of George Mason to presidency.



DETROIT—Labor-management relations in the automobile industry are growing up, and apt proof of this is furnished in the new Ford Motor Co. contract which was finally agreed on last week after some three months of negotiations, the last four weeks following the determination of an 18¢ pay raise for all employees.

This new Ford contract, a bulky document of some 66 pp., leaves few matters in shadow. It outlines management prerogatives in complete fashion, it puts down definite rules safeguarding the company from work stoppages, it puts grievance handling on a sound basis; and it gives the union guarantees also.

Most important of the new clauses in this contract are those dealing with company security. Any participant in a wildcat strike can be laid off for a 2-week period. On his second participation he is subject to longer layoff or discharge. On the third participation he is automatically classified as an instigator, subject to immediate discharge. Discharge is also the penalty for anyone attempting to control or limit production speed.

The company is specifically given sole responsibility for such matters as promotion (with seniority

a determining factor when individuals are equally qualified), production standards, plant locations, decision on when overtime shall be worked, rules and regulations, and other such matters.

On its part the union agrees that it will not countenance any strike which has not gone through the complete grievance procedure, and in no case a strike which impinges on company responsibilities or prerogatives, or which attempts to evade a decision of the impartial umpire. In return the union shop, under which non-members of the union may not continue employment after a probationary period, and a checkoff, are continued.

It is of interest to note that the union pledges in the agreement that it will make every effort to end unauthorized strikes, and that in consideration for this promise the company waived its original demand that financial penalties be assessed against wildcat strikers and/or the union. It is specifically stated in the contract that if a period of time establishes that the layoff and discharge penalties for wildcaters are insufficient to maintain work continuity, the matter may be renegotiated.

Ford won a good share of its effort to reduce the number of committeemen working in the plant. The number was cut down from 672 to 263, but all members of the latter group will devote full time, at company expense, to the pursuance of grievance settlement. Previously committeemen were

given as much time as necessary to work out grievance settlements, and it goes without saying that a large share of the time on their time cards was devoted to this end.

Almost simultaneously with the announcement of the new contract came word from M. L. Bricker, director of manufacturing, that work would be resumed at the Rouge and Highland Park plants, closed since Jan. 25 because of the shortage of steel. About 38,000 employees were called back to work last Monday.

Manufacturing operations took place in the Ford and Mercury Div. this week, and final assembly will be open Mar. 11, when a sufficient bank of parts will have been built. The Lincoln plant continues closed, due to shortage of various parts obtained from suppliers.

WITHIN the Automobile Manufacturers Assn. an era has ended with the election of George W. Mason, president of Nash-Kelvinator Corp., as president to succeed Alvan Macauley, chairman of the Packard Motor Car Co. board, who resigned recently after an 18-yr tenure to the AMA office.

Other officers are: Vice-presidents, Paul G. Hoffman, president of Studebaker Corp., and Robert F. Black, president, White Motor Co.; secretary, Albert Bradley, executive vice-president, General Motors Corp.; and general manager, George Romney.

Mr. Mason has a long background in the automobile industry, start-

READY FOR SPRING: Of the ten body types comprising the 1946 Plymouth line, this special deluxe convertible is most in the spring mood. Front end has been completely redesigned, with new grille, molding and bumpers giving an impression of massiveness, length and low appearance.



NOW . . .

**A BULLARD CUT MASTER V.T.L.
PUTS SPEED CHANGES
AT YOUR FINGERTIPS**

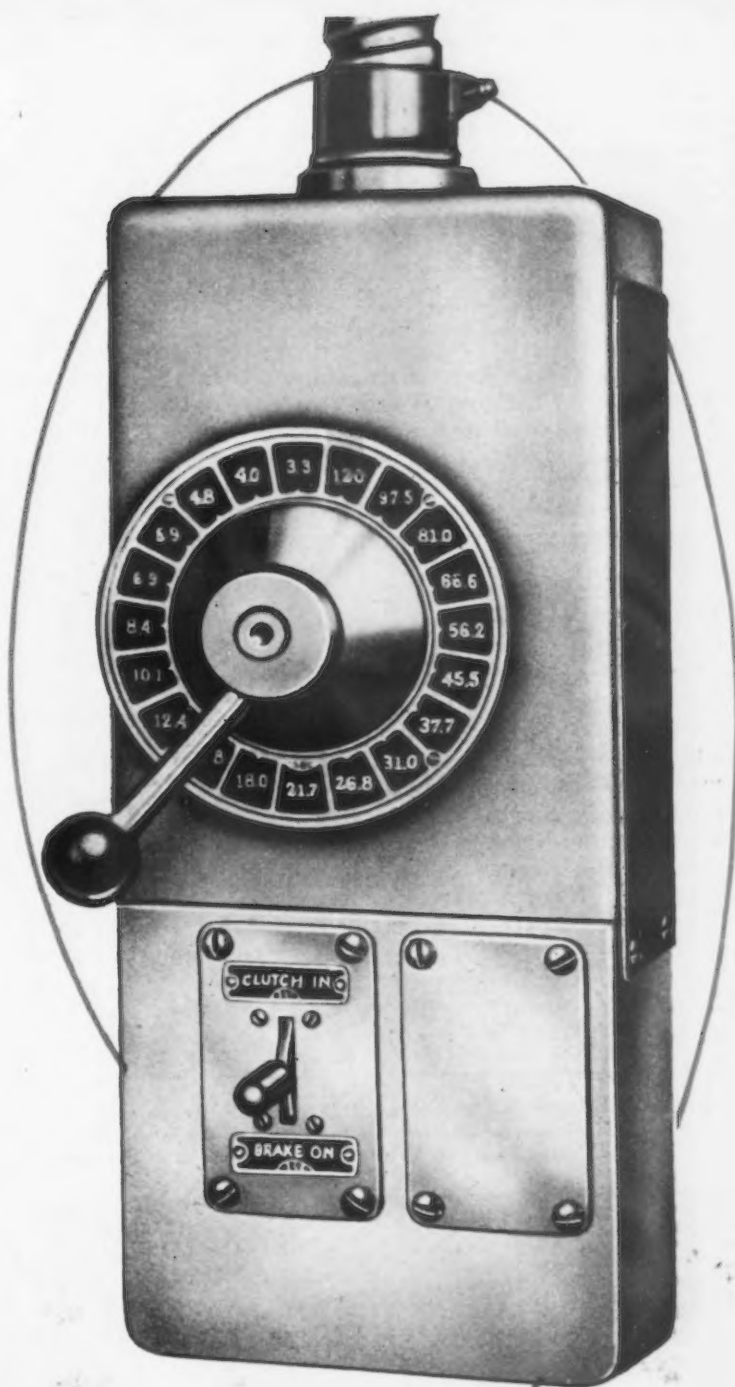
***New Pendant Control with Speed Dial
and Clutch-Brake Lever Located Where
You Want Them***

The addition of this entirely new and different Pendant Control to all Bullard Cut Master Vertical Turret Lathes provides a high degree of control and operating efficiency not found in other machine tools.

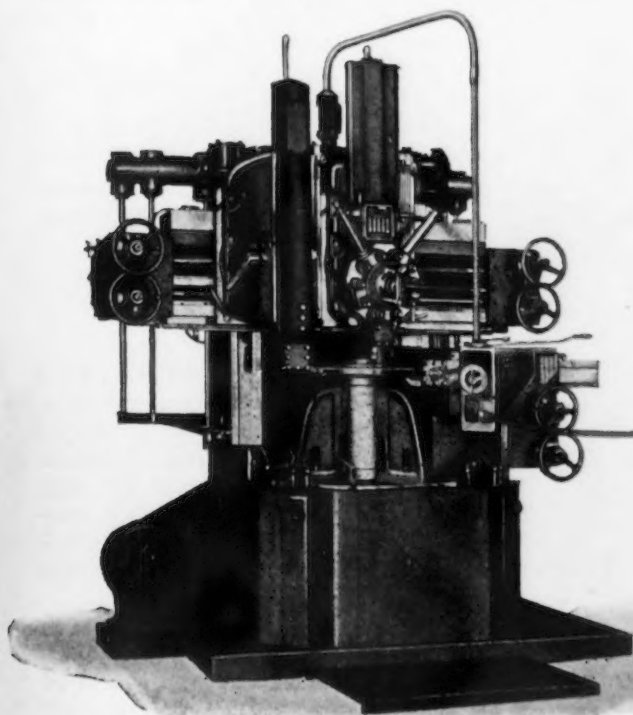
This is how the Bullard Pendant Control works. With the machine operating and a speed change needed, you throw the switch lever to "BRAKE ON" . . . rapidly dial the new speed (an exclusive Bullard Pendant Control feature) . . . throw the lever to "CLUTCH IN". That's all! . . . gears are quietly and almost instantaneously shifted through electrically-controlled, hydraulically-operated mechanisms. When you want to jog the table any fraction of a revolution for positioning or indicating, you merely manipulate the single switch lever.

This new Pendant Control is suspended at the most convenient operating height. It swings in an arc to whatever position is required for ease of operation.

For facts about other features that make Bullard Cut Masters your best investment *for cutting time on and between cuts*, write for Bulletin CVTL-4-1, today. The Bullard Company, Bridgeport 2, Connecticut.



This unique Pendant Control is now a standard specification on all Bullard Cut Master Vertical Turret Lathes which are available in 30" and 36" sizes with two heads . . . in 42", 54", 64" and 74" sizes with two or three heads.



BULLARD

**CREATES NEW METHODS
TO MAKE MACHINES DO MORE**

ing in his youth when he was associated with his father in an automobile distributorship in Valley City, N. D. After graduating from the University of Michigan in 1914, where he studied engineering and business administration, he joined Studebaker Corp. Shortly thereafter he went to the staff of Dodge Bros.

After a short tenure in banking at the end of the first World War he joined Maxwell Motor Corp. in 1921, while it was in process of reorganization under the late Walter P. Chrysler. In 1924 Mr. Mason became works manager of Chrysler.

Two years later he left Chrysler to become vice-president of Copeland Products, Inc., and was elected president a year later. In 1928, however, he became president of Kelvinator Corp., and under his administration during the next years the company increased its production of sales from 75,000 to 316,000 units. Negotiations in 1936 resulted in a merger of Kelvinator Corp. and Nash Motors Co., and Mr. Mason became the president of the new firm.

Under his administration the Automobile Manufacturers Assn., organized in 1913, will continue its

program of cooperative effort in the public and industry interests.

Although AMA is known very casually in the public eye, it wields an important influence in the affairs of the automobile companies. In the patent field it administers the cross licensing agreement under which members have pooled their patents for use by other members without royalty payments. It conducts research and renders service to members on subjects relating to manufacture and use of motor vehicles, including markets, employment, safety, highway construction and finance, foreign trade, commercial highway transportation, taxation, government programs and policies including legislation, rail and highway and ocean freight traffic, and others.

Machine Tool Trade Entangled in Web Of Pricing Policy

Newark, N. J.

• • • Dealers in this area are not too happy about the current situation which, in the main, may be described as dull, although a few bright spots appear here and

there. The highly industrialized nature of this section of New Jersey, including as it does, representation of almost every known type of manufacture, makes for a fairly consistent demand for all kinds of equipment. The general feeling among most manufacturers, however, is not so much bitterness over present conditions, as a resigned, hopelessness, and they are unwilling to make large investments in new equipment when at any moment they may be obliged to suspend operations for an indefinite period. Faced with an unreasonable increase in labor costs and a sharp rise in raw material costs, and with no relief in sight in the way of selling price increases, they are not disposed to risk their rapidly diminishing reserves.

Inquiries continue to come in, but most of these are in the nature of window shopping, either with a view to finding out what may be available if and when conditions again permit production at a reasonable profit, or to discover how much of a bargain can be had by purchasing surplus equipment. Exporters also, are eying the market with considerable interest, and are apparently getting ready for business, but here again there is very little actual buying.

The many war plants in this area are providing a heavy supply of surplus conveniently located in the buyer's back yard, and many dealers are finding themselves forced to handle this. The profit involved is marginal, and a conscientious dealer who accepts the moral obligation of servicing such equipment may end up with a net loss. There is, however, the angle of customer goodwill to be considered.

Decrease in Net Profit

Boston

• • • Union Twist Drill Co., after \$689,920 for depreciation and amortization, and \$2,365,000 reserves for United States and Canadian taxes, showed a net profit last year of \$828,815, equal to \$4.14 a common share on the 200,000 outstanding shares. The net for 1944 was \$953,522, or \$4.76 a share.

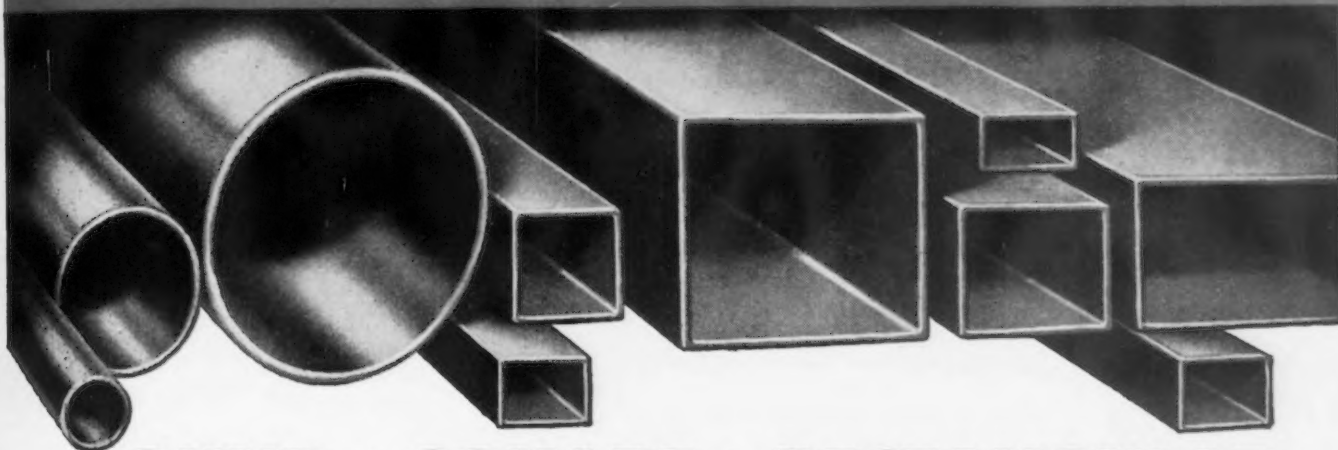
Sales for 1945 were approximately 21 per cent less than for 1944. Net working capital at the end of 1945 was \$6,223,689, as against \$4,668,967 at the close of 1944.

RECONVERSION: Photo shows M/Sgt. F. E. Hensel, only battle casualty to lose parts of both arms and legs, at the wheel of his new 1946 car which he and his wife will drive on a tour of the southwest section of the country.



Michigan **WELDED STEEL TUBING**

The Modern Electric Resistance Welded Steel Tube



**ROUND * SQUARE * RECTANGULAR
and SPECIAL SHAPES**

SIZES: $\frac{1}{4}$ " to 4" O. D. GAUGES: 9 to 22

The manufacturing method employed in the production of Michigan welded steel tube results in a uniformly smooth, scale-free surface.

Offered in commercial mill lengths or cut to specified lengths, shaped and fabricated ready for assembly.

Engineering advice and technical help in the selection of tubing best suited to meet your needs.

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PRODUCTS COMPANY**

More Than 25 Years in the Business

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Factories: Detroit, Michigan and Shelby, Ohio

DISTRIBUTORS: Steel Sales Corp., Detroit, Chicago, St. Louis, Milwaukee and Minneapolis — Miller Steel Co., Inc., Hillside, N. J. — C. L. Hyland, Dayton, Ohio — Dirks & Company, Portland, Oregon — James J. Shannon, Milton, Mass. — Service Steel Co., Los Angeles, Calif. — American Tubular & Steel Products Co., Pittsburgh, Pa. — Strong, Carlisle & Hammond Co., Cleveland, Ohio — C. A. Russell Inc., Houston, Texas — Drummond, McCall & Co., Ltd., Toronto, Canada.

Washington . . .

L. W. MOFFETT

• Senate subcommittee prods government to speed disposal of its huge holding of industrial facilities . . . Senator sees threat to private enterprise.



WASHINGTON—Despite the scarcity of building materials for new construction and the urgent need to get all available facilities back into immediate production of peacetime, civilian-type goods, the government itself seems to be falling down on the job. An outstanding reason for this lag, of course, is the policy in handling labor disputes. But there is another. This relates to disposal of surplus property. Contrary to a general impression, the government which owns fully 50 pct of the nation's industrial plant facilities is making slow progress in turning over its war plants to private ownership.

It is widely recognized that a herculean task confronts government authorities in disposing of these enormous holdings. At the same time sentiment is growing in Congress that something must be done to speed up the work. Even such liberal-minded members as Sen. Joseph C. O'Mahoney, D., Wyo., are disturbed that unless the government lets go soon of these properties it may take over in competition with private enterprise. The Senator, who is Chairman of the Senate Surplus Property Subcommittee of the Committee on Military Affairs, said as much when he recently presented

to the Senate a subcommittee progress report on disposal of surplus property.

"Obviously, it would be a very easy thing, with the government owning such a tremendous amount of industrial facilities, for the government to retain the ownership and engage in the operation of plants, but the Congress of the United States and the people of the United States have, apparently without material exception, been of the opinion that these plants should be used by free private competitive industry," Senator O'Mahoney declared.

Of the government-owned plants which have been or will be declared surplus, there are 1540 which are capable of independent operation, the report pointed out. At present, about 650 of these are equipped for peacetime operation. Another 250 to 300 are readily adaptable or suitable for conversion to production of nonmilitary items.

Yet, less than 12 pct of the government's industrial plants have been leased or sold to date. At the disposal rate attained in January—57 plants representing an original investment of about \$122 million—it would require at least two years to complete the job, even if lease of the installations were to be accepted as complete disposal. If cost, rather than the number of plants, is used as the yardstick to measure progress, the operation would require a minimum of seven more years for completion.

In a searching analysis, the report placed a finger on several weak spots of the problem, made several recommendations for improvement, urged more rapid action in disposal. Perhaps as a hint to the War Assets Corp. which absorbed the Surplus Property Administration on Feb. 1, the subcommittee report reminded Congress that that body had sufficient authority to take a hand if war agencies were lax in declaring properties surplus.

The subcommittee recognized a number of factors as contributing to the delay but placed the major causes squarely on the doorstep of both the disposal agency (then the

Reconstruction Finance Corp.) and the plant-owning agencies.

One of the major causes of delay in disposal, the report bluntly stated, was "bottlenecks created through indiscriminate centralization in the hands of a few Washington officials."

While field agencies are empowered to conduct negotiations, all transactions regardless of size had to be submitted for approval to the RFC Board and all field recommendations for disposal passed through an elaborate chain of officials. The final down occurred when, with few exceptions, only two officials were designated to present to the Board the proposals which had been processed by the Washington office.

All of which was indicative to the subcommittee that the RFC regarded the task of disposal as just another job handed to it to be accomplished and as a result did not give adequate consideration to either the size of the task nor the difficulties attending it. In consideration of the limited organization allotted to the work, the report said, it was surprising that the number disposed of is as large as it is.

The other major factor in delaying disposal operations was held to be the failure of owning agencies to promptly declare their plants as surplus.

As of Jan. 31, slightly more than one-third of the total number of plants which will eventually become surplus had been declared by the owning agencies. Actually, only 495 plants out of 1540—or an investment of \$2.8 billion out of a total of \$11.2 billion—had been surrendered by the agencies to be leased or sold by the disposal agency. Of these, approximately one-third were owned by the RFC itself while the Army had declared surplus 107 or a third of its plants. The Navy had at the time declared eight plants surplus.

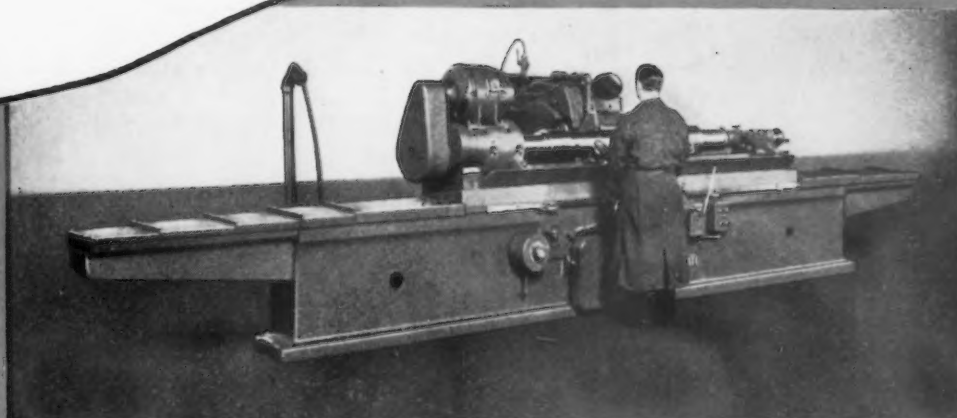
The RFC was not inclined to regard its failure to declare its own plants surplus as holding up negotiations. In support of that viewpoint is the fact that as the owning as well as the disposing agency, the RFC could authorize inspection by potential purchasers of any plant

These five Cincinnati features



**MAKE IT EASIER
TO GRIND**

**AVY MULTIPLE
AMETER WORK**



● **TOP:** Grinding a Diesel locomotive axle on a Cincinnati 16" x 96" Plain Self-Contained Grinding Machine.

● **BOTTOM:** Another view of the same machine, showing the loading cradles which facilitate mounting the work between centers.

The Cincinnati Plain Self-Contained Grinder shown in these illustrations is grinding several diameters on a Diesel locomotive axle weighing more than 1200 pounds. Five important features facilitate precision grinding operations on this type of work:

1. Filmatic grinding wheel spindle bearings.
2. Automatic acceleration and deceleration of table at reversal.
3. Power rapid traverse to the cross slide.
4. Variable speed headstock drive.

5. Loading cradles.

The first two are standard machine equipment, while Nos. 3, 4 and 5 are supplied at extra cost. These features and many others contribute to the ability of Cincinnati Plain Self-Contained Grinders to remove metal quickly; to size accurately; to produce high quality finishes; to run continuously for years. Complete specifications may be obtained by writing for catalog G-491-2.

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CENTER TYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES • CENTERLESS LAPPING MACHINES

whether actually declared surplus or not.

Be that as it may, with the other owning agencies the failure to declare plants surplus promptly made preliminary inspections by interested parties virtually impossible and precluded the assembling of sufficient data by the disposal agency to open sales drives or even begin negotiations in respect to such plants.

The subcommittee was not disposed to take a charitable viewpoint in either case.

"Regardless of what agency owns the plants, failure to declare plants surplus promptly has the tendency of postponing the assumption of full responsibility for disposal by the disposal agency," the report declared.

As of Jan. 31, only 171 of the 495 plants declared surplus had been disposed of by sale and lease. Of this number, 130 plants representing an original investment of \$181 million had been sold; the remaining 41 plants representing investment of \$213 million had been leased for varying terms. This left 1369 or about 88 pct of the plants in government possession; or, look-

ing at it from another viewpoint, about 96 pct of the original \$11.2 billion investment remained for final disposal.

That a good job has been done in recouping for the public purse a high percentage of the original investment is not to be denied. The 130 plants sold outright brought a return of \$124 million, some \$57 million less than the original investment. This has been in accordance with the provision of the Surplus Property Act which declares that one of its objectives is to "prevent, insofar as possible, unusual and excessive profits" in dealing in war surpluses.

The report, however, expressed doubt if undue emphasis on this specific point is conducive to the development of a balanced and effective plant disposal program particularly at a time when stepped-up disposal can "contribute greatly to stemming inflation, providing jobs and saving scarce building materials."

The immediate problem from the subcommittee's viewpoint would seem to be for the disposal agency to determine to what extent disposal activities with respect to me-

dium-sized plants can be decentralized, whether all commonly used sales methods are being employed, and to what extent a natural reluctance to sell plants on a stripped basis is responsible for delays.

It is evident that increased decentralization of plant disposal activities cannot be brought about without strengthening administrative procedures and practices now in effect. Under past methods and practices, appraisal of plant disposal progress is made all the more difficult because of the failure of both disposal and owning agencies to develop and utilize standard methods and statistics.

In connection with its report, the subcommittee offered several recommendations for the guidance of agencies concerned, looking to the improvement in plant disposal methods. They were:

(1) Plants must be declared surplus promptly by the owning agencies. Paper work must be simplified to speed up surplus declarations. . . .

(2) Selective disposal policies must be developed to assure speedy disposal, particularly of medium-sized general-purpose plants. Decentralization and more aggressive and better-timed sales campaigns are imperative. Decisions to strip plants of special equipment must be reached quickly.

(3) Recommendations with plant-disposal policies contained in reports submitted . . . must be carried out promptly and effectively.

(4) Statistical analysis must be strengthened to form the basis for controlling disposal progress and developing disposal programs.

(5) Regulations with respect to sales procedures implementing the general plant disposal regulation prescribed by the Surplus Property Administrator must be formulated and published in the Federal Register. . . .

Recognizing the fact that the recommendations outlined were not self-executing, the report asked that funds be made available to the subcommittee for proper staffing and equipping it to continue constant surveillance of both the owning and disposal agencies. In that way it could make certain that plant disposal is effected as rapidly and efficiently as possible.

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Sockets are formed on a 9-plunger press from cold rolled steel, .034" thick. Stock is pre-zinc coated; coating acts as a lubricant and helps insure a final finish which will require little or no buffing or polishing.

One job currently running at Advance Stamping Company, Detroit, is the production of sockets for a brand-new type electric lamp.

Eight Carboloy Sheet Metal Dies cup and progressively draw these cold rolled steel sockets, from stock to finished part at the rate of one every 12 seconds.

N. J. Nolan, Vice-President of Advance Stamping Company, says this about the Carboloy Dies on this job:

"... all draw dies are made with Carboloy Cemented Carbide Inserts as we have found that in the production of some of our War items, die life, over our best drawing quality die steel, is increased from ten to fifteen times. *There is a much greater saving than just the increased die life as it reduces our downtime in production, resulting in greater production per day.*"

Wherever used, Carboloy Sheet Metal Dies run up the same kind of performance record. Apply them in your shop and get:

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| 2 Uninterrupted Operation | 5 Closer Tolerances |
| 3 Fewer Rejects | 6 Better Finishes |

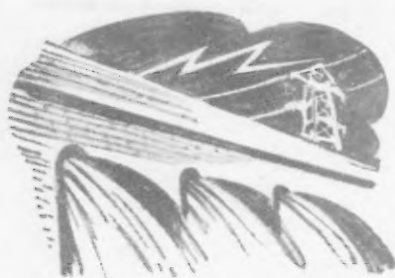
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• **Aircraft manufacturers continue high operating rate in own and foreign fields . . . San Francisco is stimulating nonferrous business . . . Labor continues to hold up production.**



LOS ANGELES—As is fitting and proper, things are definitely looking up for the aircraft industry.

The postwar period toward which stockholders and management of this war-boomed industry looked with some apprehension is here and it turns out to be not so full of air pockets as some feared. Production of aircraft of course has dropped to a low point in comparison with the peaks of wartime, but there are still enough craft being put into the air to maintain a healthy industry. However, alert manufacturers were not caught with their flaps down when cutbacks came and they were ready to branch out into other fields to keep their plants and employees reasonably busy.

At the peak of production 600,000 workers were employed in the airframe industry on the entire West Coast—half of these by subcontractors. A recent survey showed that today approximately 85,000 are still employed and with the heavy backlogs of orders for commercial transports running into the hundreds of millions of dollars, little curtailment is expected. The most serious cutback in employment is occurring at the Lockheed Aircraft Corp. where approximately 2000 employees will be let

out in the next two weeks according to Courtlandt C. Gross, vice-president and general manager. Gross reported that the layoffs became necessary when production failed to increase after the company had granted a 15 pct general wage increase. The payroll currently numbers 29,500 persons of which 23,000 are in the manufacturing end.

Lockheed with its heavy orders for commercial ships and its work on super speed planes such as the P-80 Shooting Star, is not pinning all of its hopes for the future on a wing and a prayer. Through Airquipment Co. which Lockheed owns, this company will design, manufacture and merchandise ground handling and aircraft servicing equipment such as jacks, ladders, stands, cranes and tow trucks. It has purchased Pacific Engineering Corp., manufacturers of aircraft ground handling equipment and merged it with Airquipment.

Northrop Aircraft Inc. has acquired three subsidiaries as part of its diversification program: Salsbury Motors which will manufacture 6 hp engine, an automatic clutch and transmission, a two-wheeled motor scooter and a "turret truck" designed for industrial materials moving; Northrop Gaines Inc. which is manufacturing light-weight, cast aluminum materials handling equipment and industrial wheels; and Northrop Hendy, founded jointly by Northrop and the Joshua Hendy Iron Works of Sunnyvale, Calif., which is engaged in the development of gas turbines.

One of the strangest aircraft under construction is Northrop's gigantic flying wing bomber reported to have a wingspread of nearly 200 feet. This company is also at work on a two jet engine flying wing, in which the pilot lies prone in the cockpit, and is working secretly on some improvements on this ship which is known as the XP-79.

* * *

CONSOLIDATED - VULTEE Aircraft Corp. recently purchased control in the ACF-Brill

Motors Co., Philadelphia, which manufactures trolley cars and motor buses. Through this purchase it also acquired Hall-Scott Motor Car Co., Berkeley, Calif., which makes bus, marine and industrial engines. At its Nashville plant it is now tooling up for the production of gas and electric kitchen ranges to be sold by the Aviation Corp.

In the aircraft field Consolidated-Vultee has a four-engine, jet propelled bomber underway which is said to have a fuselage longer than that of the B-29 Superfortress. Known as the XB-46, it is expected to fly before the end of this year. The company is also at work on the jet propelled XP-81 which has already been flown.

Interstate Aircraft & Engineering Corp., which during the war produced a light trainer for the Army and Navy, has discontinued all aircraft manufacture and is now manufacturing soft drink dispensing machines.

Timm Aircraft Corp., manufacturers of a Navy trainer and Army troop glider, is now turning out vacuum cleaners and soft drink vending machines with orders for the latter running into \$1 million.

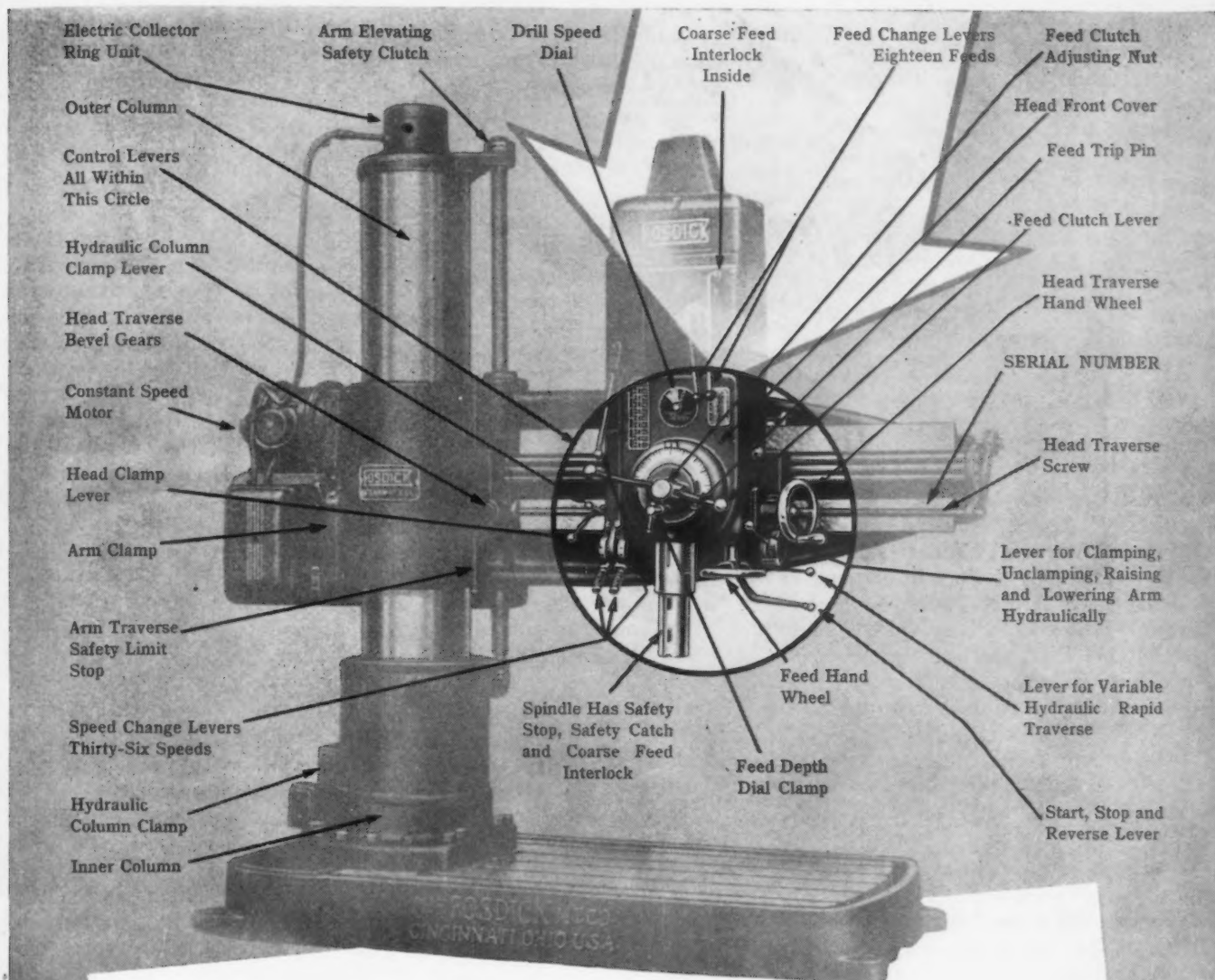
Douglas Aircraft Co., busy on orders for commercial planes, is reported as contemplating entering the jet fighter class with a rocket-like plane for the Navy, and presumably is working on the XB-43, a twin-jet version of its XB-42 Mixmaster.

Ryan Aircraft Co. of San Diego is understood to be developing a successor to its jet propelled Fireball which will have a gas turbine turning a prop and an advanced jet engine.

North American Aviation, Inc., is preparing two jet planes—the XP-86 for the Army and the XFJ-1 for the Navy. Both have swept-back wings and a single air scoop in the nose. A four-engine, jet propelled bomber is also being developed.

The often mentioned possibility of several of the larger aircraft companies going into the household appliance business gives no

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immediate evidence of becoming a reality. It is believed the heavy demand for commercial planes will retard this development for the time being.

* * *

SAN FRANCISCO—The Industrial Dept. of the San Francisco Chamber of Commerce under leadership of G. L. Fox, manager, has organized a nonferrous metals committee for the purpose of studying the western production and improved availability of aluminum, copper, magnesium and other metals and increased fabrication of these metals in the Bay area.

With Ernest L. Mathy of Victor Equipment Co. as chairman, the committee members are: G. L. Beaver, General Electric Co.; Roy Fellom, Fellom Publishing Co.; Wm. K. Allen Ferguson, Reynolds Metals Co.; Howard Flye, Aluminum Co. of America; Frederick H. Hadley, McKinsey & Co.; William M. Jensen, William M. Jensen Co.; Harry A. Lee, Pacific Gas & Electric Co.; W. P. Lind, The Permanente Metals Corp.; J. D. Mackenzie, American Smelting & Refining Co.; K. M. Reid, Scoville Mfg. Co.; S. J. Rosbert, Bayshore Machinery & Pipe Co.; A. C. White, The Dow Chemical Co.; A. L. Wiest, Shell Oil Co.

It is stated that the committee hopes to develop enough basic information on the need for nonferrous fabricating plants in this area to enable the Chamber to present to industrialists an inviting opportunity for investment and employment.

Strikes continue to harass those interested in the prosperity of this area. Latest development was the walkout of the workers of the American Smelting & Refining Co. last week when 150 employees left the local plant and 400 stayed away from the lead smelter at Selby, just north of here. Strikers have dropped their request for an increase from 30¢ to 21½¢ an hr but are not satisfied with the company's offer of 12½¢ an hr. Strikers are affiliated with the Mine, Mill & Smelter Workers Local 50.

Machinists are now into the fourth month of their strike with evidence that there is considerable unrest among the rank and file. The International Assn. of

Machinists has gone over the heads of the officers of Lodge 68, which is spearheading the strike, in an effort at settlement. International's president, Harvey W. Brown is conducting a poll by mail of the approximate 7000 members of the Local on proposals for settling the strike. A previous attempt by Mr. Brown to conduct a mass meeting for the same purpose ended in a demonstration which made anything like parliamentary procedure impossible. The strikers' original demand was for a 30 pct increase which has been trimmed to 23 pct. The best offer of employers to date has been a 15 pct increase with some adjustments in benefits.

The International Longshoremen's & Warehousemen's Union has voted to strike Apr. 1 unless differences with the Waterfront Employers' Assn. are settled by arbitration. Charging the employers with lockouts and "stalling" in making payment of retroactive wages, ILWU president Harry

Kaiser Steel Official Dies

San Francisco

• • • **Peer Nielsen, 42**, vice-president in charge of operations of the Fontana steel plant of Kaiser Co., Inc., died Feb.



Mr. Nielsen

28 as the result of injuries sustained in an automobile accident. A native of Denmark, Mr. Nielsen was graduated from Lehigh University with the degree of metallurgical engineer. His first position was as metallurgist with the American Rolling Mill at Middletown, Ohio. He then went to National Tube Co. at Lorain, Ohio, to become chief engineer; later became general superintendent of the Ellwood works of the same company; and in 1943 was transferred to the Geneva Steel Co. in Utah as general superintendent in charge of operations. He joined the Kaiser organization in September 1945.

Bridges has taken charge of negotiations.

Steel production in the area is practically normal with but little damage to equipment being reported. Bethlehem Pacific Coast Steel Corp. is rushing completion of a new four-acre mill depot here. The entire steel framework consisting of five 86-ft wide bays, each 375 ft in length was erected in 17 working days.

* * *

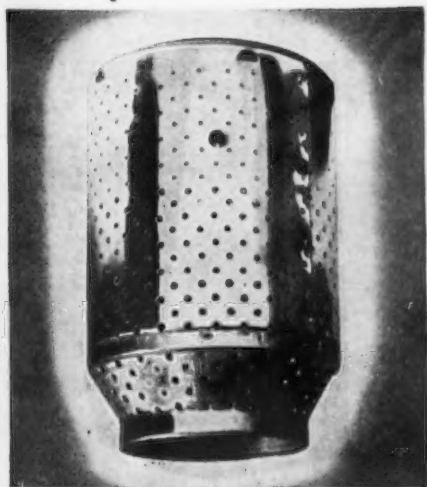
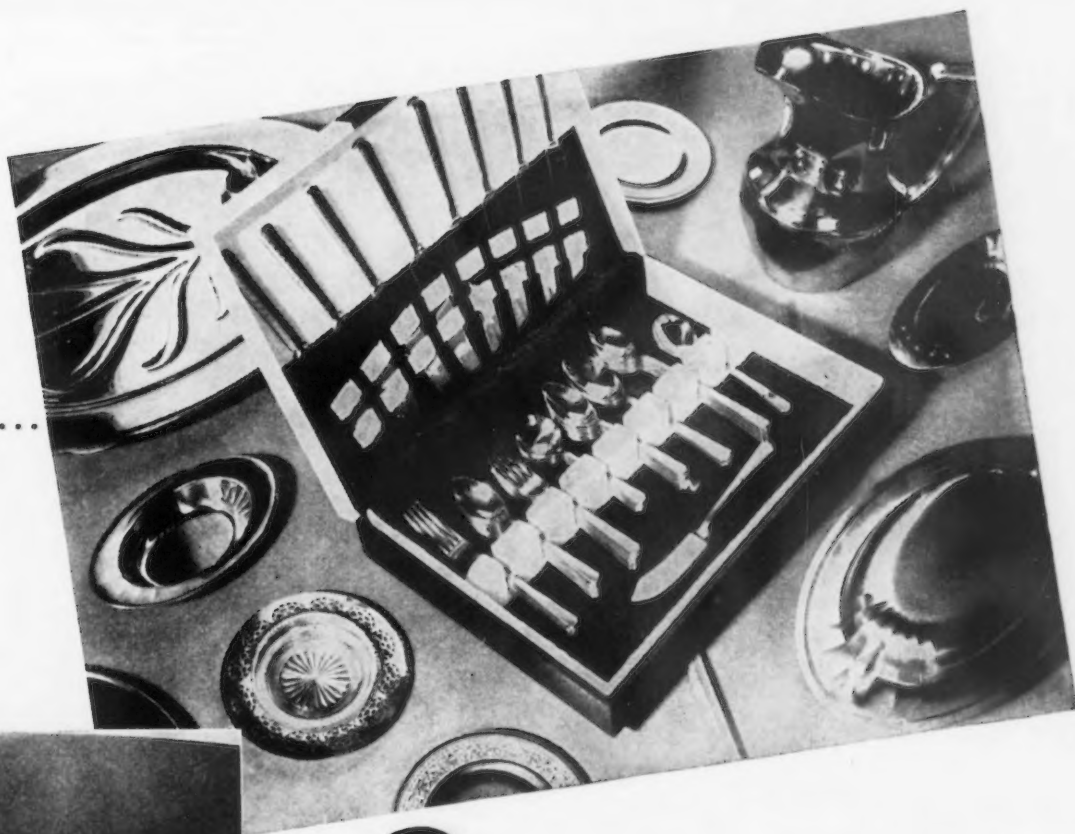
SEATTLE—Boeing Aircraft Co. is assured of a high operating rate for some time to come by the recent orders for its new 67½-ton Stratocruiser. Following the order for a fleet of 20 of the big brothers of the B-29 placed by Pan American World Airways, Swedish Intercontinental Airlines has just purchased four of the ships on a contract involving more than \$6 million it has been announced.

SILA will establish 14-hr New York to Stockholm service with the ships early in 1947. Deluxe accommodations will be provided for 40 to 50 passengers who will be carried at a cruising speed of 310 mph at 25,000 ft.

For the first time in 14 yr the Tacoma plant of the American Smelting & Refining Co. is involved in a major work stoppage because of the strike of the Mine, Mill & Smelter Workers' Union. According to Eugene White, manager of the Tacoma operation normally employing 900 persons, local negotiations are impossible because of the national nature of the walkout which involves 18 plants.

The Seattle Chamber of Commerce is reported as encouraging Henry J. Kaiser to take over the large Renton-Boeing aircraft plant as a site for the assembly of Kaiser-Frazer automobiles. It is reasoned that with the acquisition of the two aluminum plants at Spokane, for the purpose of making sheets for auto bodies, local assembly of cars would be desirable.

The board of trustees of the Chamber have already given their approval to the proposal that the War Assets Corp. lease the DPC Renton plant to the Navy with the understanding that if the place is needed for private industry the Navy would relinquish it in six months.



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Before the war, this rustless steel helped make many products look better and last longer. Today more and more designers are putting to profitable use the corrosion resistance, high strength and attractiveness of ARMCO Stainless Steels in many kinds of architectural, commercial, and household products.

Among these products and product-parts for which stainless strip is used are refrigerator evaporators, oil burner sleeves, furnace humidifiers, architectural trim, hospital equipment, cooking ware, flatware, cream separators, metal furniture, and gutters and downspouts.

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THE IRON AGE, March 7, 1946—87

• **Foreign Liquidation Commissioner arranges package sales when possible . . . Ports, ordnance depots, airfields to be included in pending transactions.**



PARIS—The sale of American built ports, docks, depots and other permanent installations is being forced by the Army's re-deployment program, according to officials of the Office of Foreign Liquidation here. Some camps, hospitals and similar units have already been sold, but negotiations are just getting underway for many of the remainder.

Sales of all such surplus material, including pipelines, ordnance repair shops, and the types mentioned above are carried out by the "fixed installations" group of the sales department of the OFLC on the basis of negotiation, rather than by sealed bids. Despite the name, the installations are not actually "fixed" inasmuch as the U. S. Government has no title to the land upon which they are built. In some cases they are being sold to users who will undertake their use on the present site, while others will eventually be moved.

The sale of all such installations could be considered extremely difficult if the European nations chose to make it so, as from a purely materialistic standpoint France could simply ignore the installations until the Army is forced through disuse and a manpower shortage to abandon them. Disposal officials hasten to point out, however, that no such attitude is being

taken on the part of France (where most of the installations are located.) At the present time negotiations are underway for the sale of those units that either the U. S. Army deems urgent because of impending abandonment, or which the French deem urgent because of their need.

To nullify as much as possible the delays of waiting for the actual surplus declaration by the Army, the fixed installations sales group has now adopted a policy of starting the study of various ports and camps, before they are declared. The sales to date have been slow as most of the declarations were not made until the first of this year.

An attempt is being made by the sales organization to specifically interest foreign countries in facilities that are located outside their boundaries. Thus, if for example France were "sitting tight" for a possible lower price on a certain facility within her boundaries, despite the fact that she needs it she may be encouraged to buy if she realizes that she is not the only ultimate purchaser, but that Poland or Yugoslavia may buy out from under her.

The fixed installation group lists its facilities under the following groupings:

- (1) Airports and airfields, including landing strips
- (2) Camps and cantonments.
- (3) Hospitals
- (4) Other troop-housing
- (5) Prisoner of war camps
- (6) Manufacturing, assembly and repair plants
- (7) Port facilities
- (8) Special signal installations
- (9) Transportation facilities, including pipelines
- (10) Miscellaneous, including bridges

There were comparatively few new airports built, with most of the American investment in this line being confined to repairs of existing structures and modernization. There were many landing strips built, however, for both fighters and bombers. Most of these were made of one of the familiar steel mat forms, and the U. S. is feeling some kind of an obligation to raise the matting and get the ground back to the farmers. There is of course an extremely urgent need to get these mats up before time for

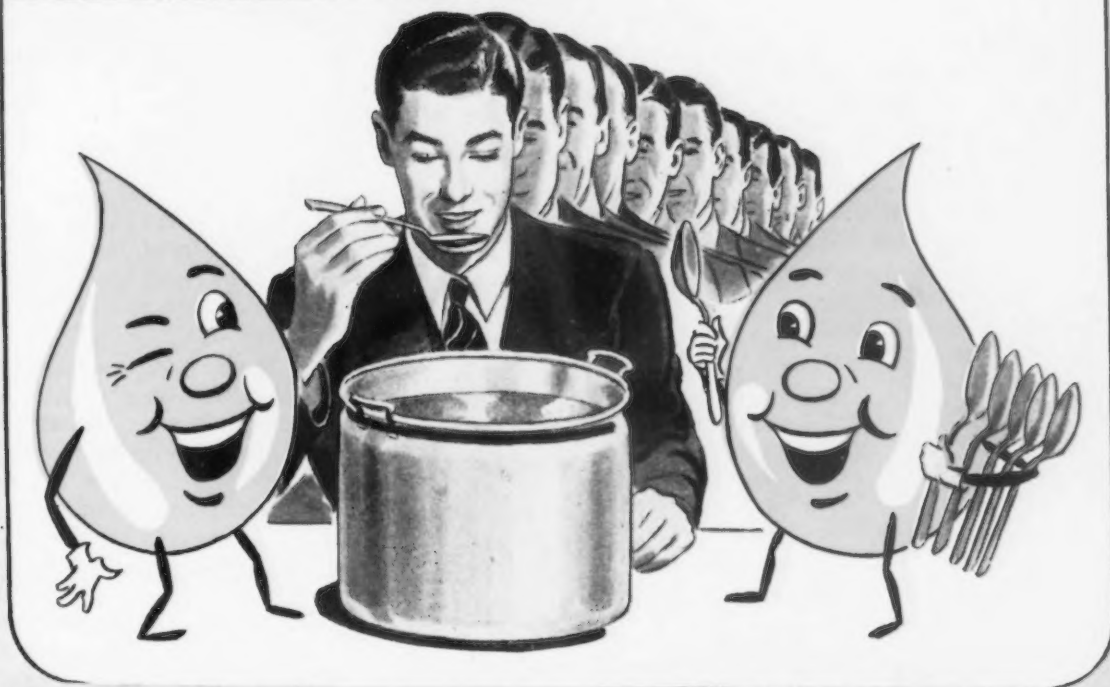
PACKAGE SALE: *All the tools and equipment to be found at an ordnance repair depot are on display in a depot just outside Paris, where prospective buyers may examine them. Officials of the Foreign Liquidation Commissioner's office show Swedish government representatives the display.*





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PROBLEM: Specifications in contract for making U. S. Army cooking kettles called for a protective coating that came off easily with cold water. Absolutely no taste or odor could remain. The manufacturer preferred a coating to be applied by dipping at room temperature.

SOLUTION: When the Shell Lubrication Engineer surveyed the problem, he recommended a Shell Ensis Oil. As a test, this material was applied to utensils of the plant cafeteria. These were washed in cold water—then placed in normal use. *Not one employee could detect the slightest trace of the Rust Preventive used.*

CONCLUSION: It pays to consult the Shell Lubrication Engineer, regardless of the nature or size of your lubricating problem. Write for a copy of Shell's 40-page booklet on Rust Preventives. Shell Oil Company, Incorporated, 50 West 50th Street, New York 20, New York; or 100 Bush Street, San Francisco 6, California.



No one really cares what a Rust Preventive tastes like, but the maker of U. S. Army cooking kettles had to be sure that the Rust Preventive could be completely removed so that it would not taste!

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the spring plowing, so that France can become independent of food imports.

Just how far the U. S. is justified in holding out in an effort to get dollar returns in the face of such an urgency for removal, is a difficult decision to make. Ultimately it seems doubtful if there can be much return from the small airfields, other than the possible scrap value of the mats. The largest portion of the investment in all types of airfields was in labor, and there is no possibility of any return from that unless the country involved wants an airport bad enough to pay for it. The disposal of the communications, meteorological, and navigational equipment located at the airfields is a separate problem, and is being handled by the OFLC in cooperation with the War, Navy and State Depts.

The troop housings include 8 summer style redeployment camps which have already been sold to the French which are intended for temporary housing of laborers, including prisoners of war in use by French industry, and nine "winterized" camps yet to be sold. There is a huge transient camp of a more permanent nature near Marseilles, designed to accommodate 70,000 troops at a time that will also go on the block. This camp includes in addition to the tents, cots and maintenance equipment a number of prefabricated concrete and steel shelters, as well as some of plywood. Despite the possible necessity for moving all or part of the units, the huge reconstruction proj-

ects to be undertaken, using much PW labor renders these camps marketable.

The negotiations for the sale of such installations start after the Foreign Liquidation Commissioner's staff has studied the costs of construction, estimated depreciation for useage and arrived at a suggested price for the package as a going concern for some purpose.

When this stage is reached a prospectus is put out for the installation, and all of OFLC's contact men bring it to the attention of possible buyers. Those interested take it up through their regularly established channels for surplus buying, and meetings are held to discuss uses, or price if it is an issue. The OFLC's fixed installations group offers technical assistance to any prospective buyer, and may recommend price adjustments to the OFLC if they are deemed wise.

Among the installations for which negotiations are presently underway are the port of Cherbourg and an Ordnance truck overhaul depot near Lyon. The port of Cherbourg is a unique case in that although the French government will definitely want it, there are certain undesirable features that will make it difficult to recover the face value. Principal drawback is the location. In normal times Cherbourg was not a major cargo port. Le Havre was the north coast port with greatest proximity to Paris, and much cargo was trans-shipped by canal there up the Seine to Paris.

Thus, although the conversion of Cherbourg to a major port by the Allies during the war was a great engineering feat, and will leave an ultramodern dock there, its economic usefulness to the French in peacetime must needs dictate the price that France is willing to pay. There are other port facilities located at Le Havre, Rouen and Marseilles in which the French Government is interested, and this disposal problem is being approached on the basis of a package sale of all four ports at the suggestion of the French. Complete studies have not been made of the facilities, and negotiations are stalled until they are ready.

The ordnance repair depot is also the subject of negotiations with the French Government, although there is some possibility that other countries may also be interested. A constant source of amazement to all Europeans is the organization of the American Army to keep its vehicles in repair and maintained, overhauled and on the road. The repair depot in question is a typical example of the organization to do so. Major overhaul of trucks, including virtually complete dismantling of engines on an assembly line is included.

France now finds herself in the position of having an Army equipped with American trucks, in need of an overhaul facility when the American Army leaves, and being offered one already in operation in a French building. The bargaining on both sides for this plum is enthusiastic, but to this date indecisive. Two smaller overhaul facilities in the same general location may also be included in this sale in another package deal.

Ordnance's use of all available existing facilities for vehicle repair has left hundreds of thousands of dollars in American machine tools in 8 or 10 French automobile plants that should prove one of the easiest items to sell of the whole collection. Here again an effort is being made to sell to outsiders as well as to the firm where the equipment is located. The tools are largely special lines to adapt for American vehicles, or to fill up gaps caused by war damage. Some of the material well integrated into plants will doubtless be disposed of to the firms, while the rest may find buyers in other countries.



Transatlantic Daily Mail

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PERSONALS

• • •

• **Henry J. Trossen** has been appointed vice-president of Republic Coal & Coke Co., Chicago. Formerly a vice-president of North American Coal Corp., Mr. Trossen joined Republic Coal in 1941 as manager of the lake dept.

• **William C. Chisholm**, since 1944 executive vice-president and treasurer of the Foster Machine Co., Westfeld, Mass., has been made president-treasurer to succeed **Henry S. Washburn**, who becomes chairman of the board.

• **R. W. Moffett** has resigned as president of By-Products Steel Corp. to become general manager of fabrication of Lukens Steel Co., Coatesville, Pa., and **C. L. Huston, Jr.**, has resigned as president of Lukenweld, Inc., to become executive assistant to the president of Lukens Steel Co. **Robert W. Wolcott**, president of Lukens, also has been elected president as well as chairman of the board of both By-Products and Lukenweld, subsidiaries of Lukens Steel Co. **Lester M. Curtiss**, who has been general superintendent of Lukens, has been appointed general manager of steel plants.

• **James C. Skinner** has been elected vice-president and treasurer of Thomas & Skinner Steel Products Co., Indianapolis. **J. R. Thomas** has been named to continue as president of the firm and **H. P. Rockwell, Jr.** will serve as executive secretary.

• **A. W. Zimmer** has been appointed works manager of Reo Motors, Inc., Lansing, Mich., heading up all manufacturing and production by the company. He was factory manager at Reo from 1938 to 1940, participated in the aircraft engine program of the Allison Div. at Indianapolis until 1942, and then returned to Reo to set up war programs.

• **William E. Curran** has been elected a director of the Rheem Mfg. Co., New York. He has been a vice-president in charge of all manufacturing activities for the company since October 1943.

• **W. J. Allard**, associated with Ford Motor Co. for more than 15 yr as a chassis engineer, has been appointed chief chassis engineer of Kaiser-Frazer Corp., Willow Run, Mich.

• **H. W. Hartman** has been named works superintendent of the American Works, of American Steel & Wire Co., Cleveland. Mr. Hartman's former position of works superintendent at Newburgh Wire Works will be filled by **J. E. Brown**, who was formerly assistant chairman of the wire and finishing committee in the industrial engineering dept.

• **Henry H. Knapp** has been appointed service engineer of the Railway Equipment Div. of American Welding & Mfg. Co., Warren, Ohio.

• **Lawrence A. Pomeroy, Jr.** has been appointed traffic manager of National Malleable & Steel Castings Co., Cleveland, succeeding **Carl L. Stripp**, who has retired because of ill health.

• **Gordon L. Edwards** has been appointed vice-president of the U. S. Steel Corp., New York, and will also continue to serve as treasurer, the position he has held since 1927. His elevation to the position of vice-president follows nearly 47 yr of continuous service with the corporation and its predecessor companies. He is also a director and officer of several subsidiary companies of U. S. Steel.

GORDON L. EDWARDS, vice-president, U. S. Steel Corp.



• **Capt. R. E. Jones**, USNR, has been appointed assistant general manager of the Blaw-Knox Div. of Blaw-Knox Co., Pittsburgh.

• **Edward C. Hoenicke**, general manager of the Foundry Div. of Eaton Mfg. Co., has been appointed a member of the Gray Iron Foundry Industry Advisory Committee to the Army Industrial College, Washington.

• **Walter G. Newnam** has been appointed metallurgist, U. S. Steel Supply Co., Chicago, serving on the staff of the operating vice-president. He previously was associated for 7 yr with the Gary plant of Carnegie-Illinois Steel Corp., and later was a metallurgical engineer at the Dodge-Chicago aircraft engine plant.

• **Jay M. Holmes** has joined the Reynolds Metals Co. as industry manager, Marine Div., with headquarters in Louisville.

• **Ray P. Tennes** has been elected president and director of the Shaffer Bearing Corp., Chicago. **J. F. Ditzell** has been elected executive vice-president, general manager and director; **A. H. Williams**, vice-president in charge of engineering; **M. J. Tennes, Jr.**, vice-president and director; **I. B. Lipson**, secretary and director; **Horace E. Tennes**, director; **A. L. Gray**, treasurer; **E. H. Ferguson**, assistant treasurer; and **H. P. Lucas**, comptroller of the company.

• **George Gibbs**, former president of the Gibbs Steel Co., Milwaukee, has been elected a vice-president of A. M. Castle & Co., Chicago, and will be in charge of the Gibbs division recently acquired by Castle.

• **Clifford T. Butler**, plant manager of the Hercules-operated Radford ordnance works in Virginia, has been appointed superintendent of the Hercules Powder Co.'s dynamite plant at Bessemer, Ala., succeeding **Hugh B. Sanders**, who has retired.

• **Charles A. Fitz-Gerald, Jr.** has been appointed sales engineer for Sloss-Sheffield Steel & Iron Co., Birmingham. Mr. Fitz-Gerald has served with the iron and steel branch of the WPB and more recently in the office of chief of ordnance.

PERSONALS

• **Duncan C. Macdonald**, associated with the American Steel & Wire Co., has retired as district purchasing agent at Worcester, Mass., as has **Robert R. Buckley**, district purchasing agent at Cleveland. **Roger W. Berrett** has been named assistant purchasing agent of the company with headquarters in Cleveland, and **T. M. Haddock** has been made district purchasing agent in Cleveland, succeeding Mr. Buckley, while **Martin A. Blinn** has taken over Mr. Macdonald's duties as district purchasing agent at Worcester. **Thomas D. Hudson** has been appointed assistant district purchasing agent at Cleveland and **Frank D. Evans** has been moved up to assistant district purchasing agent at Chicago.

• **Glenn McDowell** has been appointed manager of roll sales of Aetna-Standard Engineering Co., Youngstown, Ohio. He has been with the company since 1925, recently as assistant to the vice-president with the assignment of coordinating production and expediting. **William D. Todd** has been appointed assistant to the president of the company. During the war Mr. Todd was a member of the Harriman Mission in London and later director of the Steel Div., WPB in Washington.

• **Howard N. Girardin** has been appointed assistant to the president of the Empire Tool Co., Detroit. He will also continue in his present capacity as sales manager. **Harlow E. Ohr**, who was with the company since its organization in 1940, has been made director of production control and purchases.

• **C. L. Richard** has been appointed special representative of the Scale Div. of Fairbanks, Morse & Co., with headquarters at Chicago. For 19 yr Mr. Richard was a member of the National Bureau of Standards staff. The past 3 yr he served the Ordnance Bureau of the U. S. War Dept. as advisor and consultant on problems of gaging and weighing in the ammunition production industry.

• **Robert W. Cornell** has been elected comptroller of the Parker Appliance Co., Cleveland, succeeding **Oliver W. Berndt**, who has resigned.



H. ROBERT HUGHES, assistant chief engineer in charge of raw materials, Jones & Laughlin Steel Corp.

• **H. Robert Hughes** has been appointed assistant chief engineer in charge of raw materials of the Jones & Laughlin Steel Corp., Pittsburgh. He joined the Jones & Laughlin engineering dept. in 1923 at their Aliquippa works.

• **Roger W. Batchelder** has been appointed general purchasing agent of American Brake Shoe Co., New York, replacing **William T. Kelly, Jr.**, now president of the company's Kellogg Div. Mr. Batchelder, who was in the Army Air Force during the past 5 yr, has been with Brake Shoe since 1933.

• **King D. Boyd**, recently released from Navy service, has joined the Detroit Diesel Engine Div. of General Motors Corp. as district manager of the petroleum industry sales in the Gulf Coast region, with headquarters at Houston, Tex.

• **Nicholas Kelley, Jr.** has been appointed resident attorney for the Chrysler Corp., Detroit, succeeding **L. L. Colbert**, recently designated president of the Dodge Div. Mr. Kelley has been with Chrysler Corp. for 10 yr.

• **L. S. Gilleo** has been appointed sales engineer representative in the Michigan, Ohio, and Indiana territory and **L. L. McMaster, Jr.** in the Middle Atlantic states, for Dzus Fastener Co., Inc., Babylon, N. Y.

• **Alfred F. Gauron** has been appointed field engineer for the New England district of Advance Pressure Castings, Inc. His headquarters will be at Amesbury, Mass.

• **John F. Wilkes** has been appointed technical director of Dearborn Chemical Co.'s railroad dept. in Chicago. He returns to Dearborn after 4 yr service with the Army.

• **John A. Metz** has been appointed Chicago district sales manager for P. & F. Corbin Div., American Hardware Corp. of New Britain, Conn.

• **Earl A. Long**, former assistant director of the Los Alamos atomic bomb laboratory, has been appointed a professor in the University of Chicago's new Institute for the Study of Metals.

• **Irving C. Brown** has been appointed sales manager of Industrial Electronics Div., Raytheon Mfg. Co., Waltham, Mass. Before joining Raytheon, Mr. Brown was sales manager of Thomson-Gibb Electric Welding Co., Lynn, Mass.

• **Boone Gross**, former president and general sales manager of Gooderham & Worts, Ltd., has been made general sales manager of the Gillette Safety Razor Co., Boston.

• **Donald L. Colwell** has become associated with the National Smelting Co., Cleveland. Prior to his mission to Japan, where he was on special assignment for the Army Air Forces, Mr. Colwell was with the Navy Dept. where he served as coordinator of conservation since 1943. He had previously been non-ferrous section chief in the WPB Conservation Div.

• **I. L. Sparberg**, who has been with the Samuel Greenfield Co., Inc., Buffalo, for many years, has taken over the management of their midwest division. His offices will be located in Detroit.

• **M. W. Heinritz**, vice-president in charge of the Storage Battery Div. of Philco Corp., Trenton, N. J., has been appointed to membership on the Electric Storage Battery Industry Advisory Committee of the OPA.

• **C. F. Hoffman** has been named zone manager in New York for Packard Motor Car Co. **S. D. Braden** has been named Washington zone manager; **W. J. Collier**, Cincinnati zone manager; and **Hugh Prater**, Atlanta zone manager for the company.

• **Gordon P. Lovell**, formerly manager of electric accounting machine sales in Dayton, has been appointed to a similar position in the New York office of International Business Machines Corp. **T. Kevin Mallen**, recently released from the U. S. Army, becomes general manager for the Far East. He was IBM manager in the Philippine Islands prior to the outbreak of the war with Japan. **Maurits C. Boas** has been made special representative and assistant to **C. A. Kirk**, executive vice-president, on matters dealing with foreign operations. Mr. Boas was manager of the IBM special methods research dept. in New York from 1940 until his present promotion. **Allen W. Lishawa, Jr.** has been appointed manager of the special applications dept. following his release from military service. **George H. Bemis** has been made a special representative to the dairy industry, and **Harold E. Pim** has been assigned to cover the processed foods industry.

• **Jean Hoefner** has been named advertising manager of the Barcalo Mfg. Co., Buffalo. She has been associated with the company for 2 yr and was formerly in the sales dept.

• **E. R. McClung, Jr.** has joined the staff of Lukenweld, Inc., division of Lukens Steel Co., Coatesville, Pa. as welding engineer. For the past 7 yr he has been with the New York Shipbuilding Corp., Camden, N. J., first as assistant welding engineer and later as welding engineer.

• **J. E. Nyhan**, for over 11 yr assistant to the president of the National Founders Assn., has resigned. He was formerly national secretary of the National Metal Trades Assn. and will return to that association for the development of a special project in the nature of research and experimentation in the field of industrial relations.

• **Sidney R. Best** has been made advertising manager of the R. K. LeBlond Machine Tool Co., Cincinnati, succeeding **Walter L. Rybolt**. Mr. Best was formerly associated with Perry-Brown, Inc. as account executive.

• **John H. Seaton** has been named manager of the Aeronautical Mfg. Div. formerly known as the De-Icer & Fuel Cell Div. of the B. F. Goodrich Co., Akron, Ohio.

• **Emery B. Gebert** has joined Hungerford Research Corp., Murray Hill, N. J., as chief powder metallurgist. Mr. Gebert was formerly metallurgist of the Koebel Diamond Tool Co. and his prior connections include the Amplex Div. of Chrysler Corp., American Electro Metal Corp., and Metals Disintegrating Co.

• **Howard J. Kuntz** has been appointed chief engineer of customer runway engineering of Continental Can Co., New York, and will make his headquarters in the engineering dept. at plant No. 62, Chicago. **V. J. Taranik** has resigned his position as assistant to the manager of customer research, Pacific Div.

• **L. E. Osborne**, who joined Westinghouse at the age of 16 as a clerk in the tool room at the East Pittsburgh works, has been named senior operating vice-president of the Westinghouse Electric Corp., Pittsburgh, and is responsible to the president for all manufacturing units of the company. His new responsibilities also include all subsidiary manufacturing companies as well as the district manufacturing and repair dept. and the Headquarters Mfg. Div. of Westinghouse. **R. W. Gemmell** has been appointed manager of the aircraft sales dept. of Westinghouse in Lima, Ohio. Special representative of the Small Motor Div. in the Pacific Coast district, he succeeds **N. C. Reed**, who was transferred to the Elevator Div. of the company in Jersey City, N. J.

• **Grover C. Schantz** has been made production superintendent of Optimus Equipment Co., Matawan, N. J. He was previously plant superintendent at Metalwash Machinery Co., Irvington, N. J.

• **Russell W. Boettiger** has been appointed sales manager of Leslie Co., Lyndhurst, N. J.

• **John H. Coghlan**, 58, New England representative of the American Manganese Steel Co. of Chicago, died recently.

• **Col. E. J. W. Ragsdale**, 61, chief engineer of the Railway Div. of the Edward G. Budd Mfg. Co. in Philadelphia, died of a heart attack Feb. 24. He joined Budd as a research engineer shortly after World War I when he resigned his commission. Here he promoted the use of four-wheel brakes for automobiles, invented the shotweld system, and developed many of the design and comfort features of the streamlined stainless steel railroad passenger cars.

...OBITUARY...

• **J. Milton Hughes**, affiliated with the Sharon Steel Corp., Sharon, Pa., for 45 yr, died Feb. 13.

• **Sidney C. Vessy**, 80, president of W. W. Sly Mfg. Co., Cleveland, died Feb. 14.

• **Arthur R. Haley**, general manager of the Pittsburgh Plate Glass Co.'s Columbia Cement Div., died at his home in Zanesville, Ohio, on Feb. 14. Previously he had served as president and general manager of the J. P. Loomis Coal & Supply Co.

• **Leonard H. Davis**, 73, consulting engineer of Union Carbide & Carbon Corp., New York, died Feb. 19 after a short illness.

• **James W. Higgins**, chemical engineer for the Packard Motor Car Co., Detroit, during the last 30 yr, died recently.

• **Carl Cochran**, 56, general superintendent of the Niagara Machine & Tool Works, Buffalo, for 20 yr, died Feb. 20.

• **Huston W. Bartholomew**, 61, superintendent of the Cooper-Bessemer Corp.'s Grove City, Pa., plant, died recently of a cerebral hemorrhage. He had been associated with Cooper-Bessemer 44 yr.

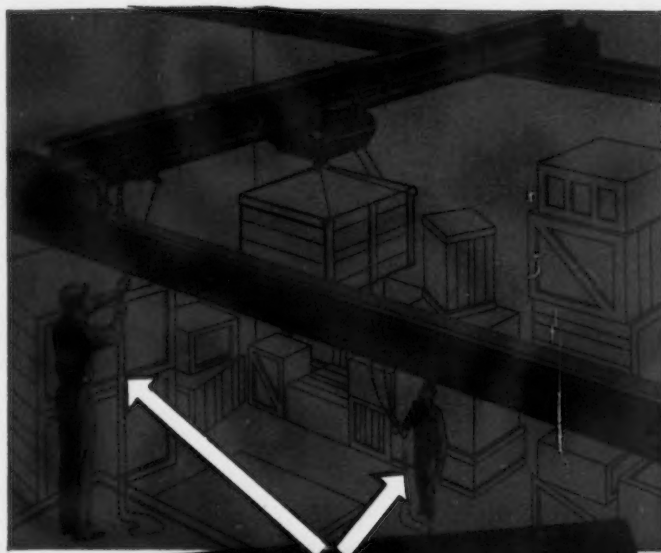
YOU DON'T NEED

"PULL"

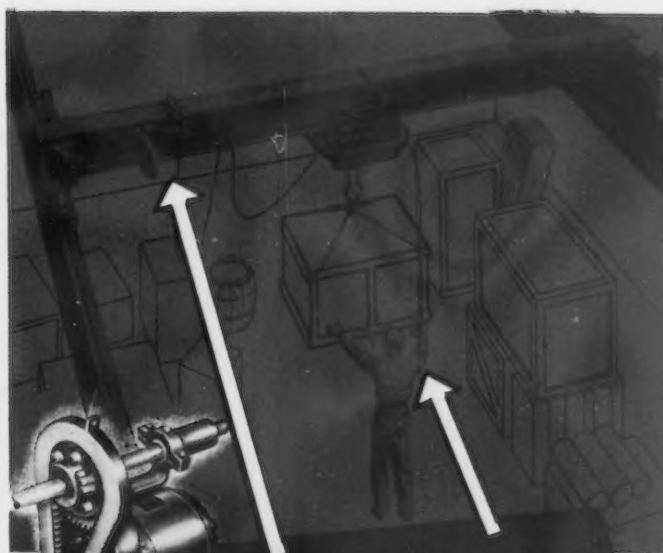
IF YOU HAVE A

Northern TRAVELATOR

MOTOR TRAVEL FOR HAND TRAVELED CRANES



Without the Travelator an extra man has to pull on the travel chain as he climbs around boxes or other materials by the wall.



With the Travelator, the man at the hoist travels the crane by push button control. No chain pulling—no climbing.

The Patented Northern Travelator eliminates the "pull" in hand traveled cranes—provides electric motor power travel with pendant push button control.

It provides faster, easier operation—makes the crane far more serviceable and satisfactory.

And—it's economical to buy—very easy to erect. Any good mechanic can apply it to your crane in less than half a day. No part of the crane is removed or dismantled, except the pull chain.

*Thoroughly Reliable...
Durable...* WRITE FOR BULLETIN T-2

NORTHERN ENGINEERING WORKS

2615 Atwater Street, DETROIT 7, MICH.

• Offices in Principal Cities

Dear Editor:

CROSLLEY ENGINE

Sir:

We have received many favorable comments on the very fine article concerning the new Crosley engine, which appeared in the Jan. 24 issue of *THE IRON AGE*. May we at this time compliment you and your staff on the fine article on our engine and car, for which we, at Crosley Motors, anticipate a bright future.

W. W. HOCKNEY
Development Engineer

Crosley Motors, Inc.,
Cincinnati

DISPOSAL OF MATERIALS

Sir:

I am interested in buying structural steel shapes and plates and would like to have information on contract termination activities, involving disposal of above materials. Have been in touch with the RFC, but would like to receive information on a tonnage of 18 in. I beam 124 lb x 41 ft—6 in., where located, to whom sold, etc.; reference made to American Car & Foundry tonnage, Maryland or Virginia. Please let me know who, besides RFC, disposes of surplus structural steel.

V. W. TARNAY

Victor W. Tarnay,
Bridgeport, Conn.

● In most instances these disposals are handled by the contractor or sub-contractor, and advertising is carried in *THE IRON AGE* and many other business papers to place the material on the market. Products unsaleable in this manner can be declared surplus to the appropriate governmental agency such as Army, Navy, Maritime Commission, etc., all of whom operate under regulations established by the War Assets Corp., which has taken over the functions of the former Surplus Property Administration. To develop the information on a specific lot, suggest you send your inquiry direct to the American Car & Foundry Co.—Ed.

STAINLESS STEEL

Sir:

We have read with a great deal of interest your article on "Stainless Steel" by T. W. Lippert which appeared in the Jan. 3 issue. We would like to know whether or not it is possible for us to obtain three reprints of this article as we feel it contains very helpful information.

JAMES E. NORCROSS
Sales Manager

Arcos Corp.,
Philadelphia

● We did not reprint this article, but are mailing you three tear sheets.—Ed.

HIGH SPEED STEEL

Sir:

We have received a letter from one of our inquirers requesting information on the process of annealing or strain relieving metals by subjecting them to extremely cold temperatures for a certain period of time. The inquirer continues stating that the process practically eliminates warpage of the material and also precludes the possibility of warpage occurring in the future. He states further that he recollects that this process is known as "deep freeze." Can you furnish any references to articles on this subject?

JOSEPHINE ZARRIELLO
Information Service

Society of Automotive Engineers, Inc.,
New York

● We have sent tear sheets of "Some Effects of Sub-Zero Cooling on the Tempering of High Speed Steel" and "An Appraisal of Subzero Hardening of High Speed Steel."—Ed.

STEEL ROLLING MILLS

Sir:

We find that we do not have a complete resume of steel rolling mills covering structural, bar and plate shapes. If you have such a list available, we would appreciate your sending us a copy of same.

MELVIN P. SPITZEN

Elizabeth Iron Works,
Elizabeth, N. J.

● We are forwarding two lists of companies covering structural steel and iron and steel plates mills.—Ed.

PLATING ALLOWANCES

Sir:

Have you published any articles or can you give me any information on the subject of how plating allowances are handled in production and on production drawings?

If a precision part which has to be assembled with other precision parts is shown on its detail drawing with certain dimensions and tolerances, and when this drawing also specifies a plating process which calls for a plating of certain thickness, what is the practice followed in production—to give the dimensions on the detail drawing both before and after plating, or have the drawing carry the final dimensions only and have the shop make allowance for the plating when machining the part?

F. K. VAN ALMELO

38 East St.,
Fairport, N. Y.

● There is no general custom regarding the matter of plating allowances and how they are shown on working drawings. The problem is complicated by the fact that al-

though it is easy to specify machine dimensions with proper tolerances before plating, it is very difficult to specify dimensions for plating to very close tolerances because of the variations in the thickness of plate on different spots of the parts being plated. The following practice is in use in certain instances: (1) specify machined dimensions before plating, and (2) specify dimensions after plating and subsequent grinding, lapping, etc. The shop will learn from experience how much plate to put on to take care of the final dimensions.—Ed.

FACE MILLING

Sir:

We would appreciate receiving a copy of the article "Effect of Work Position in Face Milling" by Fred W. Lucht. This article appears in the Jan. 24 issue, pp. 64 through 68.

H. F. EISENGREIN
Plant Engineer

Steel & Tubes Div.,
Republic Steel Corp.,
Brooklyn

● Tear sheets have been sent.—Ed.

HOT DIP GALVANIZING

Sir:

Will you please let us have a list of prominent firms or engineers available as consultants on hot dip galvanizing, together with their present addresses. We request this information as we are actively engaged in the organization of a new industrial company that will galvanize iron sheets and tubing.

C. RUBALCABA
Gerente

Maderas y Combustibles, S. A.,
Monterrey, N. L., Mexico

● We would suggest the following firms: Wallace G. Imhoff, 905 South Bedford St., Los Angeles 35; W. H. Spowers, 551 Fifth Ave., New York City; Wean Engineering Co., 347 North Park Ave., Warren, Ohio.—Ed.

SEIZED FOREIGN PATENTS

Sir:

Enclosed find 30¢ for which please send us a reprint of "Seized Foreign-Owned Patents and Patent Applications for Metal Products and Processes," which original list was published in your magazine about a year ago.

SEYMOUR TROY

Eastern Metal Products Co.,
Tuckahoe, N. Y.

● Reprint has been forwarded.—Ed.

BERYLLIUM COPPER

Sir:

We would appreciate receiving tear sheets of the article entitled "Heat Treating Beryllium Copper for Peak Performance" by H. G. Williams which appeared in the Dec. 6, 1945 issue.

RICHARD P. SEELIG
Chief Engineer

Powder Metallurgy Corp.,
Long Island City, N. Y.

● Tear sheets have been mailed.—Ed.



They're Coming... 3 NEW MONARCHS

Watch for these names—your answer to higher production at lower cost:

"UNI-MATIC"... An automatic lathe with "production slides" (a revolutionary new principle)... and electronic control, universal tooling, universal positioning... for chucking and fixture work. Maximum production of any machine known today.

"MONA-MATIC"... A between-centers machine that makes automatic production profitable in any shop... fully automatic, fully manual or any combination. Speeds up to 3000 rpm.

"SPEED-MATIC"... A hand screw machine with automatic electronic speed change... 12 stations... spindle speeds as high as 4000 and 5000 rpm. We think you'll call it "the World's Fastest Hand Screw Machine."

More details here—in April—and if you're buying metal-turning capacity before then, write us first—department 303.

THE MONARCH MACHINE TOOL CO. • SIDNEY, OHIO



THE IRON AGE, March 7, 1946—97

This Industrial Week . . .

- **Steel Ingot Rate Rises to 76½ Pct**
- **Coal Strike Will Affect Output**
- **Price Change Being Digested**

IN the short space of three weeks, the steel industry has boosted its ingot rate 71½ points from the strike low of 5½ pct of rated capacity. This recovery, far beyond previous estimates made by steel officials, puts the steel ingot rate this week at 76½ pct of rated capacity, only a few points from the prestrike level. Difficulties in obtaining new labor recruits have evaporated in some areas and there is a definite trend towards a rate of operations which will go beyond the recent highs of 83 pct.

These high hopes of more and more steel production were dampened somewhat this week by the distinct possibility of a nationwide soft coal shutdown on April 2. The nature of the demands which John L. Lewis will make upon the coal industry are so packed with dynamite that little headway is expected to be made in the 10 days between the meeting of the two groups and the deadline set for the strike.

Most explosive item on Mr. Lewis' list will be the one calling for the organizing of supervisors into the United Mine Workers Union. This touchy factor was at the base of the coal shutdowns last October when millions of tons of coal were lost to the steel and other industries. It is a foregone conclusion that the coal operators will in a united front give a blunt "no" to any request for organizing the supervisory forces in the coal mines. This stand will be made unmistakably clear even before negotiations between the union and the coal operators begin.

WITH reports indicating the new UMW will attempt to keep the present high take-home pay with a normal 35-hr week, it is obvious that the steel industry will face added costs when the controversy is finally settled. Aside from this factor, a coal strike, which is now well within the realm of probability, would, if it lasted more than three weeks, cause a substantial portion of the steel industry to reduce its steel operating rate. Coal and coke supplies are low in the steel industry and the forcing down of blast furnaces because of lack of fuel would cut sharply into steel-making.

This week the steel industry was busy digesting the various price changes which were assigned on March 1 to most of the steel products on the steel price lists. Price increases range from \$2 to \$3 on semifinished steels to as high as \$12 a ton on some specialty items. The majority of the increases, however, were between \$4.50 and \$6 a ton and the total average worked out about 8.2 pct for all products. While carbon steel items were raised in dollars and cents per ton, the adjustment on alloy steel was on a percentage basis and called for a 4 pct increase in the base price and in addition allowed a 4 pct increase in applicable extras.

On paper, nonintegrated steel producers were afforded relief through a broader spread between the price of semifinished and finished steel products. Some steel sources, however, were of the opinion that since

the price increase on semifinished steel was so low, it might be more difficult to obtain. These sources claim that there would be little incentive for producing large quantities of semifinished steel.

On the other hand, many large steel companies during normal times need an outlet for their semifinished steel supplies, and as a result build up good trade relations with the smaller nonintegrated companies. Over the long pull it may be expected that these relationships will be re-established, but it does appear that semifinished steel will be a tight item in the near future.

GENERALLY the increase in various steel products will make little difference in the distribution of steel production among the various finished items. With reinforcing steel bars having been advanced \$4 a ton against \$5 a ton for regular hot-rolled bars, some steel officials believe that production of reinforcing bars needed in building activity will not receive any incentive for higher production.

THE IRON AGE finished steel price composite this week, which reflects the increase on a selected list of finished steel products, stands at 2.69516¢ a lb. This compares with a composite price of 2.44104¢ a lb in the period previous to the price advance. This change in THE IRON AGE index amounts to a 9.05 pct increase. The difference between the percentage announced by the OPA of 8.2 and THE IRON AGE adjustment lies in the fact that the latter uses a list of steel products which comprises about 75 pct of total finished steel output.

No reaction has come from the automobile industry on the institution of a special extra on deep-drawn quality sheets and strips, of which they consume the bulk of production. This new extra amounts to \$5 a ton and is in addition to the increase allowed for hot and cold-rolled sheets and strip.

A SLIGHT increase in new steel business last week was noticed by several steel producers, but the order level remains at less than 50 pct of that experienced in early January. This is not significant, however, because all steel companies have such a heavy backlog of unfilled business that the present rate of incoming orders is having little effect upon their thinking. By the time carryovers are wiped out over the next several months, steel order volume is expected to match wartime peaks.

It is reported that one large steel company has accepted about 10,000 tons of hot and cold-rolled sheet orders for 1946 delivery from Kaiser-Frazer, out of an inquiry made to the industry for 34,000 tons. Large flat-rolled inquiries for 1947 models of other automobile makers are expected soon.

At mid-week or shortly thereafter the OPA is expected to announce a price increase for pig iron which may amount to 75¢ a ton. An increase was made last October amounting to 75¢ a ton.

• **STRUCTURAL BOOKINGS**—The estimated total bookings of fabricated structural steel for bridge and building construction for the month of January 1946, according to reports received by the American Institute of Steel Construction, amounted to 211,182 tons. Estimated shipments for the month totaled 86,371 tons.

• **TIGHT STEEL**—WAC officials report the inability of manufacturers to get steel from mills due to the strike and subsequent price uncertainty, stepped up demand for surplus materials. At Springfield, Mass., alone, more than 1,000,000 tons of steel were sold by the Army in two days. Shipyard materials, particularly light plates, have sold more freely, while private concerns with small surplus items such as bolts, nuts, etc. have found ready buyers.

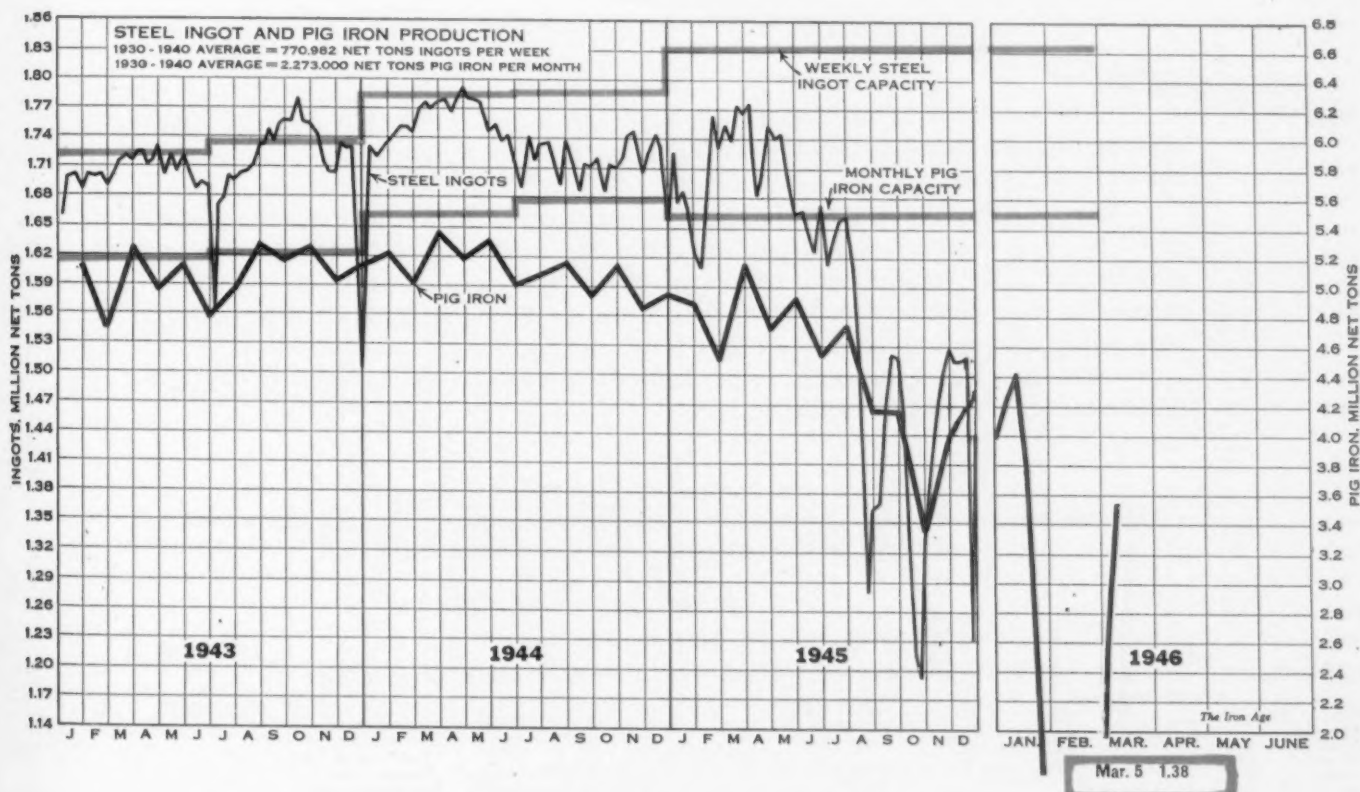
• **FIRST INDUSTRY CONCILIATION OFFICE**—The first office of the Conciliation Service of the U. S. Dept. of Labor to be devoted solely to the labor-relations problems of one industry was opened Mar. 1 in the Buckeye Bldg., Akron, Ohio, to service the rubber industry. Paul W. Fuller, the Commissioner of Conciliation who has been assigned to the rubber industry for the last four years, will be in charge of the office. Commissioners Claude Wisdom and George Morrison will assist him. Opening of the Akron office is another step in the reorganization of the Conciliation Service inaugurated by Director Edgar L. Warren. It is in the nature of an experiment and may be followed in the future by the establishment of similar facilities for other large industries having common problems, even though their plants may be less grouped, geographically, than are those in the rubber industry. This is the first movement in a realignment of the Conciliation Services. In addition to Akron, a new field office is being established at Pittsburgh.

• **FREIGHT CAR AWARDS**—The Virginian Railway is

understood to be considering fabrication in its own shops of 1500 55-ton hopper cars. Wheeling & Lake Erie has ordered 750 60-ton hoppers from American Car & Foundry and 750 50-ton gondolas from Ralston Steel Car Co. Other freight car orders include awards to American Car & Foundry of 100 70-ton covered hoppers by Missouri-Pacific, 25 50-ton steel sheathed box cars by Delaware & Hudson, and 100 50-ton box cars by Pittsburgh & West Virginia. The General American Transportation Corp. is understood to have received orders for 250 gondolas from the Minneapolis & St. Louis Railroad and 150 box cars from Detroit & Mackinac. Heading passenger car orders for the week were 214 by Pennsylvania Railroad with 57 placed with American Car & Foundry, 87 with Pullman Standard and 70 with Budd. Other passenger car orders included 18 for Northern Pacific, 14 for Missouri, Kansas, Texas Lines, and 37 for St. Louis-San Francisco Railway, all to Pullman Standard. New York, New Haven & Hartford placed 75 cabooses with Harlan and Hollingsworth.

• **COAL CASE POSTPONED**—The Interstate Commerce Commission recently postponed, this time until May 1, consideration of petitions for reopening of the case relating to rates on bituminous coal from western Pennsylvania and nearby areas to the Youngstown, Ohio, district.

• **WAC LEASES ALUMINUM PLANT**—The lease of the government-owned aluminum sheet mill at McCook (Chicago), Ill., to the Reynolds Metals Co. was announced on Mar. 1 by the War Assets Corp. The acceptance of the Reynolds proposal over offers made by three other companies was influenced primarily, WAC said, by the policies laid down by the Surplus Property Administration in its report of Sept. 21, 1945, to Congress. The lease is subject to the approval by the Attorney-General. It is a five-year lease and provides for annual rentals equivalent to 5 pct of net sales.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
February 26, . . .	73.0	63.0	63.0*	11.0	70.0*	41.0	94.0*	56.0	83.0	32.0	50.0	23.0	43.0	61.0
March 4,	91.0	75.0	73.0	55.0	86.0	47.0	94.0	83.0	93.5	44.0	54.0	83.0	102.0	76.5

* Revised

WHAT HAS TIME TO DO WITH ALLOY WELDING?



The final test of welded stainless equipment is the length of its active, efficient service life. The welds must be as good as the base metal. If the welds are not right, they will be a point of failure.

Arcos Alloy Weld Metal has a consistent record in service over a period of 15 years, as attested by equipment fabricators and users alike. Fabricators of stainless steel equipment who weld with Arcos, have the confidence that their reputation will be long-lived; users of equipment who specify Arcos electrodes, have complete confidence in the life span of that equipment.

When so much depends on so little, be sure—specify Arcos—the Alloy Electrodes with Time Enduring Qualities.



ARCOS CORPORATION .304 GULF BUILDING, PHILA. 2, PA.

Your Arcos Distributor is well informed. Your Arcos Distributor has Stock.

MIDDLE ATLANTIC

Buffalo, N. Y. Root, Neal & Co.
Erie, Penna. Boyd Welding Co.
Philadelphia, Pa. Arcos Corporation
Pittsburgh, Pa. Williams & Co., Inc.
Rochester, N. Y. Welding Supply Co.
Syracuse, N. Y. Welding Supply Co.

SOUTH and SOUTHWEST

Baton Rouge 17, La. Louisiana Welding Co.
Berger, Texas. Hart Industrial Supply Co.
Houston, Texas. Champion Rivet Co. of Texas
Kingsport, Tenn. Slip-Not Belting Corp.
Knoxville, Tenn. The Gulf Welding Equipment Co.
New Orleans, La. Hart Industrial Supply Co.
Oklahoma City, Okla. Hart Industrial Supply Co.
Pampa, Texas. Hart Industrial Supply Co.

Phoenix, Arizona Arizona Welding Co.
Tucson, Arizona Arizona Welding Co.
Tulsa, Oklahoma Hart Industrial Supply Co.

MIDDLE WEST

Albuquerque, N. Mex. Industrial Supply Co.
Chicago, Ill. Machinery & Welder Corp.
Cincinnati, Ohio. Williams & Co., Inc.
Cleveland, Ohio. Williams & Co., Inc.
Columbus, Ohio. Williams & Co., Inc.
Detroit, Michigan. C. E. Phillips & Co., Inc.
Ft. Wayne, Ind. Wayne Welding Sup. Co., Inc.
Indianapolis 2, Ind. Sutton-Garten Co.
Kansas City, Mo. Welders Supply & Repair Co.
Milwaukee, Wis. Machinery & Welder Corp.
Moline, Ill. Machinery & Welder Corp.
St. Louis, Mo. Machinery & Welder Corp.
Wichita, Kansas. Watkins, Inc.

WEST COAST

Bakersfield, Calif. Victor Equipment Co.
Fresno, Calif. Victor Equipment Co.
Los Angeles, Calif. Victor Equipment Co.
Portland, Ore. J. E. Haseltine & Co.
San Diego, Calif. Victor Equipment Co.
San Francisco, Calif. Victor Equipment Co.
Seattle, Wash. J. E. Haseltine & Co.
Spokane, Wash. J. E. Haseltine & Co.
Tacoma, Wash. J. E. Haseltine & Co.

FOREIGN

Honolulu, Hawaii Hawaiian Gas Products, Ltd.
Monterrey, N. L. Mexico Electrodo Monterrey, S. A.
Montreal, Canada G. D. Peters & Co. of Canada, Ltd.
Chile, Bolivia, Peru W. R. Grace Company

Small Producers Meet Price Increases With Slingshot

New York

• • • The long-awaited allocation of the average \$5 a ton increase in steel prices was made late last week but like all steel price adjustments it has already become subject to a cross-fire barrage of criticism. The latter, however, is of no avail because adjustments are now official and any further changes will probably not be made if at all until the industry has had three months' trial with the new quotations.

In an attempt to alleviate the plight of the small nonintegrated mill, the big steel companies went far out of their way in acquiescing to a differential between semifinished steel price increases and finished steel price advances. This was agreed upon with OPA approval despite the fact that in practically all cases the larger steel companies had either been just about breaking even or losing money on these items.

Rumblings were heard this week, however, among small non-integrated steelmakers to the effect that even though the price adjustment would theoretically help them, they were leery of obtaining

supplies. This argument was based upon recent attempts of small makers to find suppliers of raw materials. It has been claimed that the large companies need their semifinished supplies for their own mills and were not disposed to ship to the small makers.

A long-term viewpoint, according to some steel officials, indicates that during normal times many of the large steel companies are more than glad to fill semifinished steel orders in order to balance out their production program. According to these men it is unlikely that the major suppliers of semifinished steel will go so far as to completely cutoff the supply of this product.

On the other hand many of the small makers who produced cold-rolled sheets, purchase hot-rolled sheets as their raw material for this operation. With the increase in prices being the same for both items, these producers are extremely incensed because they claim that the difficulty of conversion has been accentuated.

One angle noticeable in the price adjustments suggests that the purchaser of semifinished steel

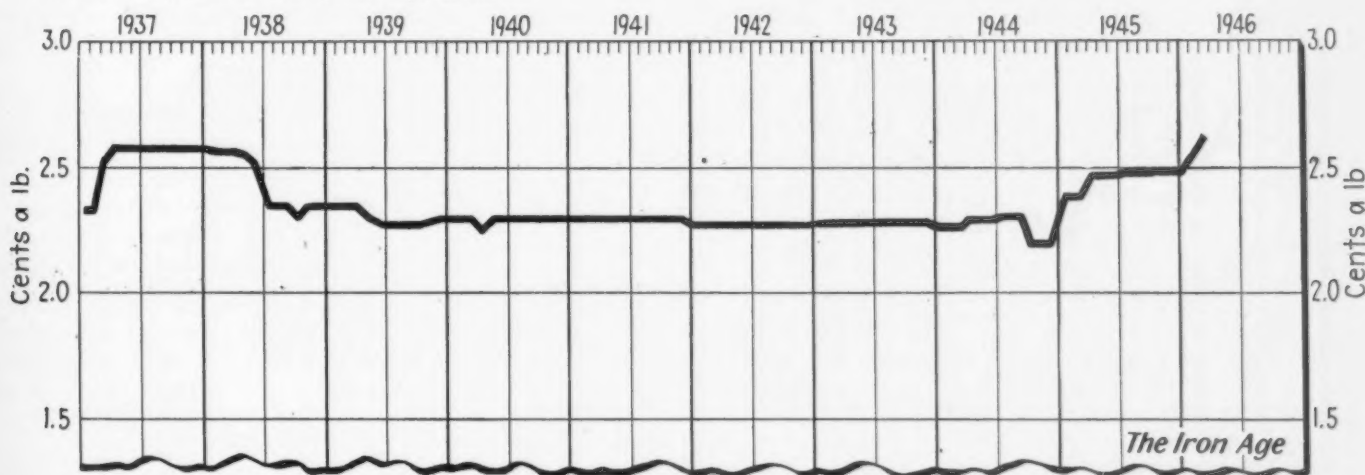
priced on a gross ton basis is better off on his finished product return than those whose raw supplies have been advanced on a net ton basis. In the first category are the mills which use sheet bars, blooms, billets, slabs and tube rounds for finished products. Sheet bars were advanced \$2 a ton while the other items were \$3 per gross ton.

On the other hand small makers who use skelp in making pipe received an advance of \$3 per net ton on their raw material (skelp), while finished pipe products have been advanced \$5 and \$6 per net ton. In the case of wire rods which were advanced \$3 per net ton, nonintegrated makers who use this material for nails and wire receive a \$7 a ton advance on nails and a \$5 a ton advance on wire fencing. It is argued, however, that these manufacturers claim inequities of substantial nature before the price adjustments were made.

Steelmakers received one surprise in the price adjustment for alloy steels. It had been expected that alloy base

(CONTINUED ON PAGE 104)

STEEL PRICE COMPOSITE: This chart shows the movement of THE IRON AGE finished steel price composite on a weighted basis from 1937 to and including March, 1946. The composite before the recent price advance was 2.4410¢ per lb which represents also the January, 1946, figure. The figure for the month of February is an average of the first 14 days before the price was advanced and the last 14 days during which the price increases were effective. Thus the February figure is 2.5681¢ per lb. The March figure which represents the application of all the price advances to the composite is 2.6951¢ per lb or an increase of 9.06 pct from the composite just prior to the effective date of the price advance. Since the price increases became effective Feb. 15, the first date in THE IRON AGE issues on which the higher composite figure can be indicated is Feb. 19. This composite contains two variables—actual changes in the prices of finished steel products and quarterly changes in the production for sale distribution of these products.



OPA Makes Amendment to Steel Price Schedule No. 6

New York

• • • The following represents a copy of the iron and steel price amendment issued by the OPA and to become a part of the Federal Register. The actual price changes are effective Feb. 15 even though the amendment will be dated Mar. 1. Revised Price Schedule No. 6 is amended in the following respects:

(1) A new Section 1306.17 Appendix H is added to read as follows:

Sec. 1306.17, Appendix H. **Modification of maximum prices for certain iron and steel products.** Regardless of the provisions of any other section of this Schedule, the modifications set forth below may be made in the applicable maximum prices otherwise established by the Schedule. The increases in basing point base prices and maximum prices may not be added to prices established by individual price adjustment orders; but companies which heretofore have been granted such adjustments may sell at maximum prices determined in accordance with Revised Price Schedule No. 6 as modified by this Appendix H or at the maximum prices established by their individual adjustment order, at their option.

A—Additions to basing point base prices for certain carbon iron and steel products. The sums specified below may be added to the applicable basing point base prices otherwise established by the Schedule for the particular carbon steel products named, both prime and secondary quality.

- (1) Ingots and sheet bars, all types and qualities.... \$2.00 per gross ton.
- (2) Blooms, billets, slabs, and tube rounds of all qualities except forging.. \$3.00 per gross ton.
- (3) Skelp..... 15¢ per 100 lb.
- (4) Forging billets and blooms \$5.00 per gross ton.
- (5) Structural shapes and piling.... 25¢ per 100 lb.
- (6) Plates—all types and qualities.. 25¢ per 100 lb.
- (7) Rails—all types and grades except light rails..... \$5.00 per net ton.
- (8) Light rails—all types and grades..... \$9.00 per net ton.
- (9) Splice bars—all types and grades.15¢ per 100 lb.
- (10) Tie plates—all types and grades.25¢ per 100 lb.
- (11) Hot rolled merchant bars and bar sized shapes—all types and grades.. 25¢ per 100 lb.
- (12) Concrete reinforcing bars—all types and grades except fabricated..... 20¢ per 100 lb.
- (13) Hot rolled wire rods—all types and grades.. 15¢ per 100 lb.
- (14) Manufacturers' wire and merchant quality wire—all types and finishes except such wire as is suspended from price control under

Amendment 6 to Supplementary Order 129....
..... 30¢ per 100 lb.

- (15) Nails and staples—all types and finishes except miscellaneous nails and brads priced on a list and discount basis..... 35¢ per 100 lb.
- (16) Twisted barbless and barbed wire..... 35¢ per 100 lb.
- (17) Wire fencing, including woven, chain link and lawn..... 25¢ per 100 lb.
- (18) Bale ties, all types..... 32.5¢ per 100 lb.
- (19) Fence posts—all types and accessories..... 25¢ per 100 lb.
- (20) Tin plate, including hot dipped, electrolytic and can making quality black plate..... 25¢ per base box.
For all such material sold on a 100 lb basis, 25¢ per 100 lb may be added.
- (21) Terne plate..... 25¢ per 100 lb.
- (22) Long terne sheets..... 25¢ per 100 lb.
- (23) Hot rolled iron and steel sheets 22.5¢ per 100 lb.
- (24) Cold rolled sheets..... 22.5¢ per 100 lb.
- (25) Galvanized sheets..... 35¢ per 100 lb.
- (26) Enameling sheets..... 35¢ per 100 lb.
- (27) a—Electrical sheets—electric, armature and field grades..... 60¢ per 100 lb.
b—Electrical sheets—all other grades..... 37.5¢ per 100 lb.
- (28) a—Hot rolled strip, 6 in. and narrow..... 35¢ per 100 lb.
b—Hot rolled strip, wider than 6 in..... 25¢ per 100 lb.
- (29) Cold rolled strip..... 25¢ per 100 lb.
- (30) Track spikes..... 40¢ per 100 lb.
- (31) Cold finished bars..... 35¢ per 100 lb.

B—Modification of maximum prices for certain carbon and alloy steel products. The maximum prices for the carbon and alloy steel products listed below may be modified in accordance with the provisions of this paragraph.

- (1) Pipe and oil country tubular goods:
 - a—Buttweld and lapweld—increase the applicable maximum base prices by \$6.00 per net ton.
 - b—Electric weld and seamless—increase the applicable maximum base prices by \$5.00 per net ton.
- (2) All alloy steel products except stainless—increase the applicable maximum price (base price plus extras) otherwise established by this Schedule by 4 pct.

Indicating Final Steel Price Advances Announced March 1

- (3) Tool steel and specialty steels, both carbon and alloy, produced by tool steel producers—increase the applicable maximum price (base price plus extras) otherwise established by this Schedule by 8.2 pct.
- (4) All carbon and alloy steel tubing (other than oil country tubular goods and carbon steel pipe)—increase the applicable maximum base price on hot finished products otherwise established by this schedule by 6.6 pct; increase the applicable maximum base price otherwise established by this Schedule on cold finished products by 9.9 pct; increase the applicable maximum extras otherwise established by this Schedule which are not calculated as a percentage of the base price by 8.2 pct. On all tubing schedules of prices, items are to be priced individually by size, grade, and for shipment to one destination.
- (5) Miscellaneous nails and staples priced on a list and discount basis—add 35¢ per 100 lb to the applicable maximum delivered price otherwise established by this Schedule.
- (6) Steel screen wire cloth. The maximum basing point base prices of steel screen wire cloth, both black painted and galvanized, in standard length rolls of 100 lineal ft and in standard widths of 18 in. to 48 in. inclusive, shall be as follows:

To Jobbers Stocks

	Carload	Less than carload	On direct shipment to dealers
AREAS OTHER THAN PACIFIC COAST			
Discount off list, of 50 and 8 pct (List in effect Apr. 16, 1941)	50 and 8 pct	50 and 6 pct	50 and 3 pct
Retail Dealer Discount off List, 40 and 10 pct			
PACIFIC COAST			
Net prices per 100 sq ft			
12 mesh black painted . . .	\$1.81	\$2.03	\$2.24
12 mesh galvanized	1.95	2.19	2.43
14 mesh galvanized	2.21	2.48	2.73
16 mesh galvanized	2.55	2.81	3.09
18 mesh galvanized	2.86	3.19	3.57

All extras, terms and conditions of sale, delivery and other services shall be maintained.

- (7) All carbon steel products except shell steel and except the products listed in (2) and (B) (1) to (6), inclusive, including but not limited to poultry netting, hardware cloth and wrought iron (but exclusive of new products priced by special order issued by the Office of Price Administration for example steel screen wire cloth 18 x 14 in. mesh—0.011 gauge)—increase the applicable maximum prices (base price plus extras) otherwise established by this schedule by 8.2 pct.

- (8) Canmaking quality black plate—all canmaking quality black plate (118 lb basis and lighter) may be sold on an area basis and the maximum prices may be computed by making the following deductions from the maximum base prices of coke tin plate: 55 to 70 lb, inclusive—deduct \$1.30 per base box; 75 to 95 lb, inclusive—deduct \$1.40 per base box; 100 to 118 lb, inclusive—deduct \$1.30 per base box.
- (2) Section 1306.8 (c) is amended to read as follows: Iron or steel products includes all of the products listed in (1) below, but does not include any of the products listed in (2) below:
 - (1) The term includes: all products listed in the Table of Capacity and Production for Sale set forth in the Annual Statistical Report of the American Iron & Steel Institute, for 1939, pp. 42, 43 and any additional products listed in Section 1306.11, Appendix B; and all such products further finished by galvanizing, enameling, plating, coating, drawing, extruding, or otherwise in a manner commonly employed by or for steel mills and rolling works. It includes such products in prime, secondary or rejected quality.
 - (2) The term does not include: Pig iron, concrete reinforcing bars to the extent that the sale thereof is covered by Revised Maximum Price Regulation No. 159—Fabricated Concrete Reinforcing Bars; cut nails or cut backs; steel gates; lead head nails; steel conduit; welding rod; wire rope slings; cast iron pipe; pipe couplings (except when attached to pipe); pipe fittings; rolled or forged axles or car wheels or any combination thereof; industrial wire cloth.
- (3) Section 1306.8 (h) (5) is amended to read as follows:

The maximum extras which may be charged for selected rimmed stock for hot and cold rolled carbon sheet and strip steel shall be the extras which are presently in effect for aluminum killed steel; however, in no instance may the producer charge more than one of the following quality extras: the extras applicable to aluminum killed steel, the extras applicable to deep drawing quality, or the extras established by this subparagraph. The extras established by this subparagraph are only applicable when drawing quality, or physical test properties or values are specified or required, beyond commercial bend tests, by the purchaser.
- (4) Section 1306.10 (i) is hereby revoked.
- (5) Section 1306.11 Appendix B is amended by the deletion of the word "conduit."
- (6) Section 1306.11 is further amended by changing that portion of the appendix which now reads "Woven wire cloth—insect, hardware, and all other" to read "Woven wire cloth—insect and hardware."

(CONTINUED FROM PAGE 101)

prices would be advanced all along the line \$5 a ton. The official order, however, calls for an advance of 4 pct in the maximum price which includes the base price plus extras. This method of raising alloy steel prices will make a substantial difference with the relationship between carbon steel products and alloy steel items. For the first time in many years the industry finds itself with the necessity for using three decimal points in arriving at finished steel prices.

Because of the paper work in figuring up the new prices for submission to its customers, the steel industry may devote the rest of this week in making up new price lists. It is expected that warehouse prices will also require considerable paper work before they have been calculated. Some sources look for an advance in pig iron prices in the middle of this week, which may run 50¢ or \$1 a ton.

Detroit Steel Plant Down

Detroit

• • • Operations at the Rotary Electric Steel Co., local electric furnace producer, continued paralyzed last week after workers rejected a company offer of 18½¢ additional pay conditioned by elimination of a bonus system at the plant.

In making the increased pay offer the company cancelled a tonnage bonus ranging from five to seven cents which had been paid the workers. Following rejection of this proposal at a union meeting, pickets of the CIO United Steel Workers Union resumed their picketing at the plant.

A recapitulation by the district office of the Steel Workers' Union showed that 22 steel plants in the Detroit area had granted wage increases. The other 35 which were struck on Jan. 21, however, are still closed. Virtually all of these are in the steel fabricator classification, whose position is that they now must pay \$5 a ton additional for their raw material, plus wage increases, and have no authorization as yet for increasing product prices.

Producers Press for Price Rises

Toronto

• • • The Big Three of the Canadian steel industry, Steel Co. of Canada Ltd., Algoma Steel Corp., and Dominion Steel & Coal Co., have applied to Wartime Prices & Trade Board, to increase basic steel prices in Canada. Executives of the Canadian steel companies have been watching the United States situation closely with regard to higher steel prices and increased wages, and state that any upward revision of wages in this country would have to be accompanied by steel price increases, as present margin of profits is very narrow. Canadian iron and steel prices have been frozen since 1940, with the exception of nails which recently were increased 35¢ per 100 lb.

Meanwhile union leaders are pressing for substantial wage increases for the 13,000 workers in the basic Canadian steel plants. Reasons given is that the Canadian Government has not accepted union proposals for "liberal and orderly progress" in the increasing of wage controls. Union leaders allege the government ignored their requests in amending its wage control order. They state there is no alternative therefore but to press for abolition of wage control through demands for a shorter working week and higher wages. Whether such demands

will be made prior to action by WPTB on steel prices is not known, but decisions of high policy on all sides are involved. The C. I. O. demands in Canada, it is stated, would increase wage costs here by about 30 pct for Ontario mills and 40 pct for Nova Scotia mills, if granted.

Canadian Government officials state that it is not possible to remove export control on steel and to return to conditions as they were prior to Feb. 2. Canada has lost to date, an estimated 160,000 tons of steel through the strike in the United States, and it is probable that it will be another month before the lost ground has been regained. The higher prices for U. S. steel also are likely to make Canadian steel even more attractive to domestic consumers, and place a greater drain on Canadian supplies.

Canadian steel producers have readjusted their operations to meet peacetime requirements and have on their books or pending, enough business for full production schedules over the next year or two to meet deferred civilian demands. Under prevailing price ceilings, Canadian steel prices are \$5 to \$6 per ton below United States steels shipped into this country when duty, freight and exchange are taken into consideration.

Pattern Cut in Steel Case Not Made To Fit Small Firms, Weir Says

Pittsburgh

• • • "Go back to collective bargaining," Ernest T. Weir, chairman of National Steel Corp., recommended as a solution to present day chaotic conditions in industry. "There is nothing wrong with strikes, and labor is not after more than it is entitled to," he said. Take government out of labor negotiations and remove price ceilings, and industry will within six or eight months be back at full production and shortages with their resultant high prices will be at an end.

Mr. Weir stated that the government's method of settling the steel strike should be heeded by every

thinking person, because if the method becomes government policy it will have consequences far worse than the most disastrous strike imaginable. Government settlement of the steel strike, Mr. Weir said, aims a death blow at small business and the livelihood of millions.

"Why does the United States Government force every steel company, regardless of its size, resources, or type of business, to operate under terms made with the biggest, strongest, and richest steel company in the country?" he asked. While not intending his remarks as a criticism of U. S. Steel Corp., because Benjamin F. Fairless, president of U. S. Steel, strongly urged that the administration invite representatives of other companies and industries into its conferences, Mr. Weir stated that it was appar-

ent that the administration wanted to deal exclusively with U. S. Steel.

That the government settlement of the steel strike was no "settlement" for the smaller companies is proved by the fact that many of them have been unable to make agreements and are still closed by the strike, Mr. Weir said. "Small and intermediate business is having imposed on it conditions that make operation impossible, despite the fact that the federal administration uses every opportunity to protest its deep concern for small business."

The 18.5¢ an hr wage increase has varied effects on individual companies, he said, and the only relief to the individual producer is to remove all price ceilings and let industry go back to full production, according to Mr. Weir. "If industry would run at full production, possible only by relaxation of government restrictions, pent up demands would be satisfied in six or eight months and competition would take care of prices, since there is no disposition on the part of business to build prices up. 'Actually,' he said, 'industry would keep prices as low as possible to encourage broad consumption.'"

Western Electric Net

Income 2 Pct of Sales

• • • Half of the dollar volume of all radar equipment bought by the government was supplied by Western Electric Co., the company revealed in its annual report. For the year 1945, Western Electric's sales to the government amounted to \$650,429,000 or 76 pct of its total sales, compared with \$788,860,000 or 85 pct in the previous year. In the four years 1942-45, the company supplied the government with more than \$2 billion worth of communication, electronic and other specialized equipment.

Total sales of the company, including subsidiaries, amounted to \$860,713,000, compared with \$926,851,000 in 1944. Of this 22 pct or \$188,916,000, went to the Bell Telephone Co. Earnings amounted to \$15,126,000 or less than 2 pct on total sales in 1945. In 1944, earnings totaled \$13,858,000.

Steel Fact-Finding Board Says Union Did Not Violate Its Contract

Washington

• • • Justification of the Administration's recommended 18½¢ per hr wage increase for steel workers and complete negation of the industry's stand that the recently ended strike constituted a breach of contract, are the salient points in the terminal report of the President's Steel Fact-Finding Board, issued Mar. 1.

While the report is largely a historical analysis of an already accomplished fact, it cannot be lightly dismissed because of the pattern it sets. It takes on added importance because it obviously has Administration approval, despite the so-called impartiality of fact-finding panels.

The report was submitted by the Board's Chairman, Nathan P. Feinsinger, Professor of Law, University of Wisconsin and Public Member of WLB, and was concurred in by the other members, Roger I. McDonough, Associate Justice of the Supreme Court of Utah, and James M. Douglas, Chief Justice of the Supreme Court of Missouri.

Historically, the report traces

the development of the dispute between the United States Steel Corp., and its subsidiaries and the USWA up to Feb. 10.

In relation to the no-strike provisions of the contract, the Board states that these provisions relate exclusively to the adjustment and arbitration of grievances.

Its conclusions on this portion of the dispute follow:

"(1) As to strikes concerning grievances, the said Section 9 of the contract provides a specific penalty, namely, suspension or discharge of the individuals involved, which penalty is apparently subject to review by the same grievance and arbitration procedure. Neither party has contended that the demand for a general wage increase constitutes a 'grievance,' or is subject to the grievance and arbitration procedure of the contract, or that there has been any other agreement to arbitrate the wage issue.

"(2) The terms of the contract relating to the general level of wages are not fixed for the duration of the agreement. The wage issue is expressly made subject to

BEER BARREL POLKA: Rolling out stainless steel beverage containers at the Firestone Steel Products plant. This view shows barrels coming from the pickling vats.



reopening, under Section 17 of the contract, on a change in the national wage policy. Such a change has been officially declared (Executive Order 9599, Aug. 18, 1945), and the wage issue remanded to the parties for final settlement by collective bargaining.

"(3) A construction of the contract which would extend the specific no-strike provisions to the demand for a general wage increase would in effect leave the final determination of the wage issue to the sole discretion of the company. In the absence of an overriding contractual limitation to that effect, the remand of the wage issue to the parties for collective bargaining carried with it the right to strike if such bargaining should reach an impasse."

In its discussion of the wage equities involved, the Board points out that the dispute was in some respects "a continuation of the 1942 and 1943-44 disputes before the National War Labor Board."

According to the Board the equities bearing on the wage issue in the dispute were: (1) The increase in cost of living since January 1941; (2) the loss of wartime "take-home" pay due to reduced hours and overtime and other factors; and (3) the earnings position of steelworkers in relation to workers in all manufacturing in-

dustries, and particularly in relation to recent wage developments of national significance.

Considering the cost of living increase of 33 pct between January 1941 and September 1945, which is used as a standard by the government for wage-price purposes, the Board states that an increase in the industry of 33 pct on the January 1941 wage base of 85.2¢ would result in an increase of 28.1¢ per hr in basic wage rates.

"If only the increase in wage rates received by steelworkers since January 1941 (15.5¢) were to be debited against this amount, an increase of 12.6¢ (28.1-15.5) per hr would still be forthcoming. If the increase in straight-time average hourly earnings between January 1941 and November 1945 (20.3¢) were to be debited, an increase of 7.8¢ (28.1-20.3) per hr would be forthcoming."

The decline in estimated average straight-time hourly earnings, gross hourly earnings, weekly earnings, as well as the decline in working hours were also considered by the Board, but no attempt to determine whether this downward trend has been exhausted was made.

On the basis of the best governmental data available, and assuming a return to the average week of 40.2 hr worked in 1942 when

steel production was at 96.8 pct of rated capacity, the Board reports that "an increase of 22.6¢ per hr would be required to restore weekly earnings to the level attained by a work week averaging 46.3 hr per week (average weekly hours worked in 1944). Assuming a return to the average week of 39 hr worked in 1941, when production was at 97.3 pct of rated capacity, an increase of 27.9¢ per hr would be required."

Pointing out that U. S. Steel has taken the position that the 33 pct increase in the cost of living had already been met by previous increases, but was still willing to offer an additional increase of 15¢ per hr, the Board states that it is a reasonable inference "that the company's offer is based on equities other than the increased cost of living, such as loss of take-home pay, wage increases granted in other industries, or a combination of these and other factors." However, the Board also says that neither union nor the company makes allowance for premium overtime when an average of 40 hr are worked in a week. While it is the announced policy of the Administration that the employer should bear some, but not all, of the loss of wartime take-home pay, the Board does not define in what proportion the loss should be shared.

The Board makes much of the position of steelworkers in relation to workers in other industries and finds that "the movement of earnings in the basic steel industry had not kept pace with the average earnings for all manufacturing industries."

Continuing the Board reports that:

"Between January 1941 and October 1945, the differential in earnings formerly enjoyed by steelworkers over workers in all manufacturing industries was reduced by approximately 4¢ per hr."

Neither the earnings position of the industry nor the price aspect was studied by the Board. In summing up its findings on the wage equities the Board concludes that "an increase of 18½¢ per hr as a possible settlement of this dispute is well within the limits indicated by the available governmental and published non-governmental data . . ."

FLOODED RHINELAND: Large areas in Germany are inundated now and many bridges are not usable. This bridge across the Rhine near Mainz is the only one that can be used in this sector.



Canada Suspends Soviet Orders

Toronto

• • • Canadian Government has suspended, but so far has not cancelled, an extensive list of industrial equipment orders from Russia. This action by the government may inconvenience a number of Canadian companies, but is not expected to result in direct financial loss to the manufacturers concerned. The suspension of this business is said not to be a result of the Russian spy ring that was operating in this country. Suspension of production on the Russian equipment orders was ordered by the Dept. of Reconstruction and Supply some 24 hr before the big spy story broke. It is pointed out that it is the logical sequel to action taken by the Dept. of Reconstruction three months ago, and has nothing to do with the espionage matter. As to whether production of goods for the Soviet will be resumed depends on Russia's willingness to take definite action regarding negotiations for long term credits with which to pay for the equipment.

Canada suspended shipments of equipment to Russia last November, pending the arrangements of satisfactory credit terms, and this suspension has been adhered to since. Thus all that has happened now is that the Canadian Government decided to take the second step by suspending production on further orders. It is stated that the amount involved by the suspension of shipments in November is approximately \$25,000,000 and a considerable amount of the equipment has been manufactured but not shipped.

The origin of the dispute goes back several months, to the time Russia was placing orders in Canada under Mutual Aid. In addition to aluminum, food and other war supplies, Russia asked for large quantities of equipment, machinery and tools, which quite evidently had postwar value. Canada agreed to supply these on condition that Russia agree to pay for any items not delivered at the end of the war. When Mutual Aid terminated Sept. 2, 1945, negotiations were started as to the basis on which Russia should pay for the equipment. Overnight, Cana-

dian officials state, the Russians became "tough and unreasonable." They demanded interest terms much below what the Canadian Government was paying for money or what was being freely accepted by other purchasing nations. The general basis of their offer was 2½ pct interest for a 30-year loan. Moscow also demanded that all goods be free of sales and other taxes (a not unreasonable demand for intra-governmental deals), and in addition that Canada cut her list prices 25 to 30 pct. Russia also sought a Canadian credit to cover purchases of other materials in Canada.

The suspension of work on Russian orders will seriously inconvenience some Canadian companies, but should not mean direct loss in the long run. Even should cancellations follow the suspension, producers believe the equipment already manufactured will find a ready market among other United Nations.

Among Canadian companies most seriously affected are makers of machine tools, such as John Bertram & Sons, Dundas, Ont., and John T. Hepburn Co., Toronto. The chief items involved in the suspension are machine tools, motors, locomotives and electrical equipment. The suspension also affects a separate order placed last year with Canadian Westinghouse Co., for electrical equipment which the government guaranteed to the extent of about \$3,000,000. It is pointed out, however, that the contracts of Canadian manufacturers are with the Canadian Government and not directly with Russia. As a result they anticipate no difficulty in making collections on all equipment delivered. Most of the equipment involved is of standard design.

Canadian companies affected by the suspension of Russian business will not feel any serious affects, other than some possible plant changes, as the majority have large unfilled backlogs of Canadian orders to fill in.

Schwartz Heads Metal Merchandising Firm

New York

• • • Benjamin Schwartz, formerly chief of the Scrap Metals Div. of Foreign Economic Administration in Washington, has announced the formation of Benjamin Schwartz Co., with offices in this city. Mr. Schwartz, who also was for 10 yr director general of the Institute of Scrap Iron & Steel, will merchandise scrap iron and steel, non-ferrous scrap metals and other secondary raw materials, as well as new steel and metal products, in the export, import and domestic trades.

During his war service in Washington with FEA, Mr. Schwartz was responsible for the purchase in 35 countries and the importation into the United States of large tonnages of scrap steel and other vital strategic materials necessary for the industrial war machine, thus reversing the pre-war tide which took out of this country large quantities of similar raw materials. The operations overseas conducted by Mr. Schwartz included the dismantling of rail-



Benjamin Schwartz

roads, ships and machinery, and the organization of scrap collection programs covering oil fields and refineries, sugar mills and plantations, mines, factories and battlefields.

Ease Tinplate Controls For Nonessential Cans

Washington

• • • Steel producers may now set aside 15 pct of their monthly tin mill production for users other than the production of containers for seasonable and perishable food products, drugs, medicinals and biologicals. This is a modification of controls imposed by CPA during the steel strike. The change officially announced on Mar. 4 was accomplished by amending Direction 9 to Steel Preference Order M-21. Previously Direction 9 required the channeling of 100 pct of tin mill products for containers for seasonable and perishable foods and drugs.

A preference schedule for tin can manufacturers established by CPA gives these products first priority on tinplate, but if available the steel can also be used for packing other products. The mandatory provision requiring that all tinplate be used for seasonable and perishable food products was removed through revocation of Direction 9 to Container Order M-81.

The Order M-81 now requires that can manufacturers should schedule their orders for tinplate so as to first meet the demands of products designated with an "A" (the perishable and seasonable food group and other products mentioned above) prior to ordering tinplate for products other than those

in the "A" group.

In order that the tinplate produced over and above that which might be required for Preference "A" products might be available to both the "B" and "C" groups, the amended order also limits the quantity of cans that might be purchased for products classed as group "B" Preference, to 10 pct of the yearly quota per month.

In addition to the above changes, the amended M-81 Order also re-establishes new packing quotas on all products with the exception of those classified under the "A" Preference group.

Offers Resignation In Protest to OPA Stand

Cleveland

• • • Reducing the sound and the fury attendant upon OPA activity in recent weeks to plain and simple words, Orrin B. Werntz, executive secretary, National Screw Machine Products Association, has offered to resign his post as secretary of the Industry Advisory Committee of OPA.

In a letter to William Anderson, head of the parts, plastics and services sections of OPA's machinery branch, who had "seriously doubted" the accuracy of Mr. Werntz' contention that nothing short of a substantial increase in formula prices will give the industry the relief it needs, Mr. Werntz stated that there appears to be "such a great conflict in our thinking at this time that I question whether

I am doing the right thing by remaining secretary to that government body as well as trying to represent our members."

Putting the industry's problem in the House committee's lap, Mr. Werntz asked that the committee tell the screw machine products industry, made up of companies averaging in peacetime less than 200,000 sales volume, how they can absorb an actual 51 pct wage increase from Jan. 1, 1941 to Aug. 1, 1945, and pay a new increase of 18½¢ per hr, which would make the total increase 75 pct since Jan. 1, 1941.

At the same time, the industry must absorb a 15 pct increase in the cost of steel without considering the extras and a contemplated 14 pct increase in the cost of brass without adjustment for extras, plus other operating supply increases.

Creates Symbol For Steel Export Orders

Washington

• • • CPA has established an "identifying symbol" for steel export orders needed to further the European rehabilitation program. Requirements for this program have been sharply screened and will be considerably below previous export estimates, CPA said.

Under direction 10 to the Order M-21 issued Feb. 28, steel export orders certified by the Office of International Operations of the Commerce Dept. should be identified by the symbol "CXS" (certified exports steel) in tendering such orders to steel producers. CPA may establish space reservation in steel producers' schedules for the benefit of these orders.

All requests for authorization to use the "CXS" symbol should be addressed to the steel section of the I. T. I. O. in the Dept. of Commerce, Washington, D. C.

Under the recently screened export steel rehabilitation needs, tinplate shipments will be halved, dropping from about 300,000 tons to around 165,000 tons for the first six months of 1946. Other essential export demands face a similar slash, CPA said. CPA also indicated that many of these deliveries expected in the first six months of 1946 will be pushed back until late in the third quarter because of the month long steel strike.

COMING EVENTS

Mar. 20-22—Production Show and Conference, Chicago Technical Societies Council, Stevens Hotel, Chicago.

Mar. 29-30—American Gas Assn. Conference on Industrial and Commercial Gas, Commodore Perry Hotel, Toledo.

Apr. 2-5—Packaging Exposition, sponsored by American Management Assn., Public Auditorium, Atlantic City, N. J.

Apr. 3-5—SAE National Aeronautical Meeting, Hotel New Yorker, New York.

Apr. 8-12—ASTE Fifth Exposition, Cleveland Public Auditorium, Cleveland.

Apr. 10-13—Birmingham Congress, Electrochemical Society, Inc., Hotel Tutwiler, Birmingham.

Apr. 11-13—Spring Congress, Electrochemical Society, Inc., Birmingham, Ala.

Apr. 22-27—National Plastics Exposition, Grand Central Palace, New York.

Apr. 25-26—Twenty-ninth AIME Annual Open-Hearth Steel and Blast Furnace and Raw Materials Conferences, Chicago.

May 6-7—Annual Spring Conference, Assn. Iron & Steel Engineers, Congress Hotel, Chicago.

May 6-10—Golden Jubilee Foundry Show, American Foundrymen's Assn., Cleveland Public Auditorium, Cleveland.

May 29-31—Machinery Dealers National Assn., national convention, Claridge Hotel, Atlantic City.

June 2-7—SAE Summer (semi-annual) Meeting, French Lick, Ind.

June 3-5—American Gear Manufacturers Assn., Annual Meeting, The Homestead, Hot Springs, Va.

June 13—Annual Spring Meeting, Metal Powder Assn., Waldorf-Astoria Hotel, New York.

June 17-18—First Annual Meeting, American By-Product Coke Institute, Seaview Country Club, Absecon, N. J.

June 24-28—Forty-ninth Annual Meeting, American Society for Testing Materials, Hotel Statler, Buffalo.

Weekly Gallup Polls . . .

Union-Led Third Party Movement Receives Little Public Support; Republican Strength Moves West

• • • If a new political party were formed in this country by organized labor—as certain union leaders have threatened to do—how many voters would be attracted to it?

Questioning of voters throughout the nation finds that about one in every ten on the average would be interested in supporting such a party, according to George Gallup, director, American Institute of Public Opinion.

Thus, sentiment for a third party is slightly greater today than the institute found in 1938 when Robert and Philip LaFollette announced their intention of starting a National Progressive party, and slightly less than it was just before our entry into World War II, when a poll found 16 pct willing to join a Keep-Out-of-the-War Party if one were started.

To test the reaction of the country to a new labor party, the institute asked voters from coast to coast this question in a cross-section survey:

"If a new national political party is organized by labor—in addition to the present Republican and Democratic parties—do you think you would join it?"

	Pct
Yes	10
No	74
No opinion	16

Questions of particular interest to political leaders in connection with such a party are how many labor union members would join it, and whether it would draw voters away from the Democratic party to any appreciable extent.

The survey indicates that about one labor union member in every four would be interested in joining a new labor party. And the drawing power of the new party would be nearly three times as great from Democratic ranks as from Republican ranks.

The vote of union members polled on the new party follows:

LABOR UNION MEMBERS

	Pct
Say they would join new party.....	24
Say they would not join	56
No opinion	20

The vote among men and women

who express a present-day preference for the Democratic or Republican parties:

	G.O.P. Voters Pct	Democratic Voters Pct
Would join new party..	5	13
Would not	83	67
No opinion	12	20

If one out of every four union members did actually join a labor party, as the poll indicates, the party would have considerable weight in elections, since the total membership of labor unions is 15,000,000 or more.

As for non-union Democratic labor voters they favor President Truman for the Democratic presidential nomination in 1948 by a majority substantially larger than is the case with union voters.

Virtually eight in every ten non-union labor voters preferring a Democrat for president in 1948 are found naming Truman as their top choice. Among union Democratic voters, about two out of three prefer Truman to any other possibility.

While Wallace is second choice of both union and non-union voters picking a Democrat, he receives a substantially higher vote among the union voters than among the non-union.

The non-union labor vote in the United States, while an important segment of Democratic party support, is found not so heavily Democratic today as the union vote. At the present time, 60 pct of all non-union voters indicate the Democratic party as their choice, as compared to 74 pct who do so among CIO union voters and 69 pct among AFL voters.

The question having to do with Democratic candidate choices:

"What man would you like to see elected president of the country in 1948?"

	Dem. Union Voters Pct	Dem. Non-Union Voters Pct
Truman	65	79
Wallace	19	10
Eisenhower	4	5
Byrnes	3	2
Stettinius	2	1
LaGuardia	1	1
Others	6	2

The question designed to mea-

sure the extent of Democratic support today among union and non-union labor voters:

"If a presidential election were being held today, which party would you vote for—the Democratic or Republican?"

	Dem. Pct	Rep. Pct
CIO voters	74	26
AFL voters	69	31
All unions combined	70	30
Non-union voters	60	40

Among non-union labor voters naming a Republican as their choice for the presidency in 1948, Gov. Thomas E. Dewey holds the lead, with twice as many votes as Harold E. Stassen, his nearest rival in the list.

Republican sentiment, spreading out from the original GOP stronghold of New England, is moving steadily westward.

Biggest Republican gains in recent presidential elections have come in counties in the East Central, West Central and Rocky Mountain states. Out of a total of 1333 counties in those areas, the Republicans carried only 244 in 1936 but increased this four years later to 846 and in the last presidential election carried 956, or a three-fold gain in eight years.

While there have been some gains in other sections, too, the main tide of GOP sentiment has been owing westward across the plains to the foothills of the Sierras, with the midwest supplanting New England as the most Republican section, and Kansas taking the place of Vermont as the most Republican state.

The number of GOP counties in each section is given in the following table. Note that in the East Central and West Central areas, Republican gains began as early as 1936 and continued large in 1940 and 1944. Between 1940 and 1944 the area of greatest GOP gains moved farther west to the mountain states.

	Total Counties	Rep. in 1932	Rep. in 1936	Rep. in 1940	Rep. in 1944
New England ...	67	52	41	38	40
Middle Atlantic...	232	123	94	126	157
East Central ...	365	89	106	261	302
West Central ..	691	32	130	502	516
South	1,306	59	79	107	146
Rocky Mountain...	277	15	8	83	138
Pacific	133	2	0	24	39
	3,071	372	458	1,141	1,338

Higgins Sees a Land of Porcelain Enamel Steel Houses

Chicago

• • • Andrew Jackson Higgins, New Orleans boat-builder extraordinary, bedded down his entourage in a \$100-a-day hotel penthouse here last week, and unbosomed himself of dreams of flooding the country with gleaming porcelain enameled steel houses on a scale that would have the steel industry panting to supply the metal.

Only such minor matters as acquiring and equipping a plant, arranging for a securities issue, and getting a firm commitment on steel seem to stand in the way of the house-hungry public getting quick delivery on dwellings that have a metal-kitchen gleam in every room, inside and out.

Walls of the Higgins houses would be formed of colored porcelain enameled steel panels, clamped together during erection so that the interior and exterior panels are about 2 in. apart. In the intervening space would be poured ordinary Portland cement to which is added a mysterious concoction causing it to bubble like a bromo. The cement sets to bind together the entire structure with a monolithic slab of light aereated concrete, resembling volcanic fufa, adding mechanical strength and insulating qualities. The roof would be of the same type of construction, supported on expanded steel trusses. No frame would be necessary, the walls carrying the load.

In its verbose description of the wonders to be accomplished by the new construction method, the Higgins organization makes no reference to any buildings embodying it having been completed. However, the material "has been in the process of development for construction purposes for the past six years, and has now been so perfected that (it) may be used in buildings to almost an unlimited degree of practice." In May, 1945, reports came to THE IRON AGE that Maurice Diggs of California had brought to Higgins for sponsorship such a method of construction. Mr. Diggs formerly operated as a contractor in the San Francisco Bay region, later being interested in promoting a luxurious but short-lived horse racetrack.

By CHARLES T. POST

• • •

Last week Mr. Diggs was pointed out as Mr. Higgins' righthand man in the housing scheme.

A new corporation financed by a public securities issue will be formed to produce the housing panels, Mr. Higgins told Chicago reporters. Higgins, Inc., on Jan. 29 filed with the Securities & Exchange Commission a registration statement contemplating a public stock issue to bring in \$9,090,000. Higgins, Inc., would acquire the boat-building and other activities of Higgins Industries, Inc., which in the first 10 months of 1945 showed a profit of \$211,595 on sales of \$41,840,720. Van Alstyne Noel & Co., New York underwriting firm, last Thursday was found guilty of SEC of "willful" violation of registration requirements in the sale of Higgins, Inc., stock and was suspended for 10 days from the National Assn. of Securities Dealers, Inc. The company has withdrawn from underwriting the Higgins common stock.

Higgins hopes to carry on fabrication and enameling of the housing panels in the government owned Higgins aircraft plant at Michoud, La., near New Orleans. The plant is a hangover from the period in which plywood "flying boxcars" were proposed as a means of winning the Battle of Britain, but that and an alternate airplane building venture never materialized. The main manufacturing building of the plant has 39 acres under roof, which it is hoped the housing manufacturing activities soon will outgrow.

Negotiations for this plant, according to a close Higgins associate, were for a time slowed down by government underlings, but since Higgins has put pressure on top officials the chances of closing the deal are described as rosy.

Higgins and his associates a short time ago ensconced themselves in plushy quarters in Washington's Statler Hotel and invited government officials and big-time

materials suppliers for conferences. (In Chicago last week, Wilson W. Wyatt, Federal Housing Administrator, said that he had examined the Higgins proposal and that his agency had it "under study." Questioned directly, he said that no endorsement had been given.)

Needs first were estimated in the neighborhood of 3500 tons of enameling sheets daily. (The entire steel industry's capacity for producing enameling sheets is about 890 tons daily.) In Chicago, last week, the stated initial needs had shrunk to 16 tons daily.

In prospect as immediate suppliers, according to a top Higgins lieutenant, are unnamed subsidiaries of U. S. Steel Corp. for the enameling sheets and Jones & Laughlin Steel Corp. or Truscon Steel Co., Republic Steel subsidiary, for the expanded steel roof trusses. This aide said that "Ben Fairless has put his right-hand man on the case," but that offers from other steel companies would be welcomed. (Tennessee Coal, Iron & Railroad Co., with its Birmingham mills, is the closest U. S. Steel subsidiary to New Orleans, but it does not produce enameling sheet.) Libby-Owens-Ford double-glazed window glass is mentioned in the official description.

Considerable flexibility of plan is afforded by the construction method, the only limitation being that basic dimensions should be in multiples of 4 ft. Although 14 different types of steel parts will be made, 90 pct of the porcelain-enameled panels in a representative house occupying 1000 sq ft would be 4 x 8-ft panels. Residential panels will be principally 18-gage steel, but specialized uses will require sizes in a 10 to 30-gage range. One section of the Higgins description calls the metal "non-carbon iron," while another calls it "low-carbon sheet steel," but the latter apparently will prevail. The enameled-metal units, known as Thermo-Namel will come in several colors. The sections, clips, ties, and functions are said to be patented.

The panels and parts will be warehoused by dealers in a variety of sizes, textures, and colors, it is

contemplated. Maximum freight costs to distributing points in the United States for parts necessary for a 1000-sq ft house are estimated at \$120 to \$140, with materials for six such houses being packed in one boxcar. Site erection is said to require only 6 hr.

Actual erection would be done by builders, who would provide the necessary cement. Higgins' only further interest would be in supplying the mysterious compound to be added to the cement, causing it to expand 125 pct in volume when setting, and a device to meter the compound into the mix.

Although Higgins has sealed his lips as to the magic ingredient which produces Thermo-Con, the cellular expanded cement, a patented material of the same general description, called Aerocrete, has been produced by the Aerocrete Western Corp., Chicago, since 1928. Aerocrete makes no mystery of the fact that aluminum powder is the basic ingredient causing the expansive reaction in its product, and that the compound also includes limestone dust. Aerocrete denies any tie-up with the Higgins organization.

The completed house, it is said, will be not more than 10 pct heavier than a corresponding dwelling of frame or plaster construction, but will be far stronger structurally. The erected cost, without contractor's profit or land, is estimated by Higgins at from \$4.25 to \$4.50 per sq ft, reckoned on the basis of a five-room, 1000-sq ft house, including plumbing, foundation, and garage.

Equipment for the Michoud plant has been lined up, according to Higgins' associates, and could be put in production within from 90 to 100 days following a green light. A daily production rate is envisioned within a year of material sufficient to build 500 houses. Equipment would cost about \$2 million. The production line would be set up to move at the rate of 16 fpm.

The sponsors point out that the completed structure is not a prefabricated building but "prefabricated unit for the construction of buildings, thereby taking out all of the limitations in planning and design of a prefabricated unit." It is described as coming under Class A fireproof construction, and it is claimed that it will meet local building codes.

Eastern Pennsylvania Steel Producers Still Continue on Strike

Philadelphia

••• A number of the eastern Pennsylvania steel producers have not yet worked out agreements with their unions and are therefore still out of production. However the Harrisburg Steel Corp. concluded an agreement last Friday for the 18½¢ per hr increase and the standard 9¼¢ steel wage retroactivity arrangement. While the company had originally desired to work out modifications of certain parts of the contract, the union resisted such changes. The men went back to work Monday.

The Central Iron and Steel Co. at Harrisburg is reported to have been unwilling to conform to the 18½¢ increase pending some assurance of price differential action by OPA. The company had been operating under a price exemption by OPA that permitted a price of 2.50¢ per lb for carbon steel plates. There is no immediate hope of an agreement and 1200 men are out.

The American Chain & Cable Co. plants at York and Reading are out of production and it is

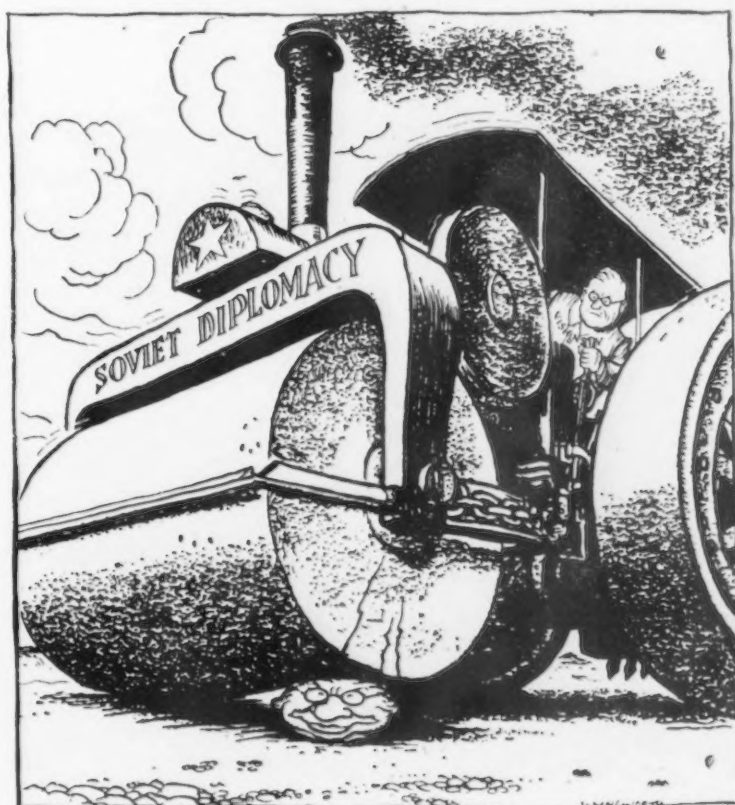
reported that agreement is dependent on the decision of executives at the Bridgeport, Conn., headquarters. Twenty-five hundred men are out at the three Pennsylvania plants.

The Birdsboro Steel Foundry & Machine Co. at Birdsboro is reported to be hedging on compliance with the WLB directive covering shift differentials and vacations with pay, and reluctant to make the standard wage increase. Twelve hundred men are out there.

At Reading, the Carpenter Steel company union went out for a week in sympathy with the CIO strike. The CIO is believed to have a strong unit here and expects to hold an election in the near future.

The Standard Steel Works Division of the Baldwin Locomotive Works at Burnham, went into production Feb. 27. The Lebanon Steel Foundry Co. of Lebanon didn't go out on strike because officials agreed to comply with the decision of the industry. No agreement has yet been concluded pending action by OPA.

The Phoenix Iron Co. of Phoenixville is not in production and no agreement has yet been signed with the union.



THE TOUGH NUT

Transatlantic Daily Mail

Canada Puts Itself at Disposal of United Nations Organization

Ottawa

• • • To keep her covenant with the United Nations Organization, Canada is setting up an establishment, comparable to a fourth service of the Armed Forces, which will make possible quick mobilization of the industrial capacity of the nation, Reconstruction Minister Howe, announced. Mr. Howe stated:

"The new 'fourth service,' Canadian Arsenals Ltd., working under the direction of the Dept. of Reconstruction and Supply, will dovetail its defense preparations with those of the Royal Canadian Navy, the Canadian Army, and the Royal Canadian Air Force. The three armed services and the Crown Co. will be jointly responsible for making sure that Canada will be in a position to rally her forces quickly if called upon by the Security Council. It previously was announced that the armed services, though not large will be hand-picked skeleton forces equipped with the most modern arms that can be obtained. It will be the task of Canadian Arsenals, not only to keep these arms in top-notch condition but also to keep government and private factories and key civilian personnel in a state of readiness."

The Minister pointed out that as a result of the war, Canada now has large scale facilities for building naval and cargo ships and aircraft. "Given a set of patterns a shipyard or aircraft plant can turn out any product within its capacity," he said. "Hence Canadian Arsenals Ltd., will not be

called upon to co-operate with such plants in the same way that it will co-operate with other potential defense industries. However, the government is aware of the importance of the shipbuilding and aircraft industries and will assist them to keep their facilities in operation. The Navy and the RCAF will keep a liaison with these two industries."

The guiding head of the industrial preparedness planning which has culminated in the Canadian Arsenals Ltd., is Col. Malcolm P. Jelley.

"Defense manufacturing in Canada will be roughly divided into two categories," Mr. Howe stated. "In the first category are civilian plants producing automobiles, refrigerators, ships, aircraft, railway equipment, clothing, and a host of other civilian items. Such plants can be rapidly converted for manufacture of war supplies and by constant liaison Canadian Arsenals Ltd., will make possible a much more rapid conversion than was possible in the early days of World War II. The activities of the Crown Co. will in no way interfere with the production of civilian articles in peacetime.

"In the second category are the plants built only to produce items of no value to the civilian. In this category are the explosives, shell-filling, gun, small arms, and such like factories. It is the intention of Canadian Arsenals to maintain plants in this second category."

The new Crown Co., with head office in Ottawa, will thus embody the Longueuil, Que., gun plant;

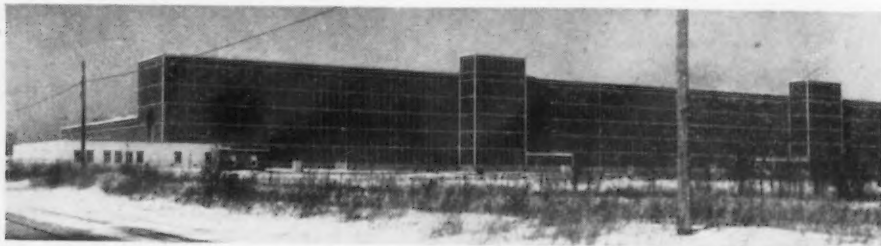
the Small Arms Plant at Long Branch, Ont., the Dominion Arsenal at Quebec City; the Lindsay Arsenal, Lindsay, Ont.; the Cherrier shell-filling plant, St. Paul l'Ermite, Que.; and a portion of Research Enterprises Ltd., Toronto. In addition the company will maintain in a stand-by condition a number of chemical and explosive plants built and operated during the war. All the plants to be taken over by Canadian Arsenals Ltd., are already the property of the people of Canada.

The Minister explained that civilian plants convertible in the event of an emergency will be kept apprised of the latest designs and development of military weapons. The Crown Co. will keep in touch with manufacturing companies with a view to co-ordinating production or potential with supplies that might need to be produced. Blueprints and specifications with manufacturing information will be kept readily available to the manufacturing companies. In addition Dominion Arsenals will keep in a stand-by condition a supply of machine tools and dies ready to be shipped to the designated plants. Thus within a short period a civilian plant would be in a position to begin setting up equipment, and production could start within a matter of weeks instead of months or years.

Canadian Arsenals Ltd., will keep abreast of the latest in military development and equipment. "Because Canada has comparatively small Armed Forces, our war equipment must necessarily conform to the designs of the United Nations Organization. However, developments in certain types of equipment will go forward in Canada. Most of these will be the work of the Dept. of National Defence but some designing may be done by engineers of Canadian Arsenals. The Crown Co. will be equipped to make pilot models of any weapons designed in Canada and also will prepare manufacturing specifications," Mr. Howe stated.

Following is a brief resume of

EXTRUDED ALUMINUM: The plant at Grand Rapids, Mich., which Reynolds Metals Co. has leased from the War Assets Corp., is said to provide capacity sufficient to triple its aluminum extrusion facilities.



the various divisions of Canadian Arsenals Ltd.:

In the gun division plans call for clearance and reconversion of the Longueuil, Que., plant, which will undertake extensive overhaul and repair work. Many guns will be returned from overseas for modification, repair and general overhaul. While most of the designs used in the plant will be those of Canada's Allies, the plant also will play a part in design, particularly in the matter of converting details of design in forms which lend themselves to Canadian or American type of manufacture. The Longueuil plant already has called in all gun parts and tools in the hands of gun manufacturers at the close of hostilities. These will be stored and kept in condition. As new designs are developed, the manufacturers will be given an opportunity of studying the blueprints and working out manufacturing techniques suited to their facilities.

The Small Arms Div., located at Long Branch, will be kept in operation on a small scale and will be in a position to design new weapons and make pilot designs from its own or Army designs. If necessary, it could start full-scale production in a short time.

The Small Arms Ammunition Div. will be situated in the Quebec Arsenal and will manufacture practice requirements of all types of ammunition for rifles, pistols, carbines, machine carbines and machine guns, also cartridge cases for larger guns. It also will have the responsibility of working on new designs, of collecting and storing single purpose machine tools built for small arms ammunition during the war, of maintaining contacts with manufacturers, and of collecting and revising design drawings, tooling designs and other technical information.

The heavy ammunition division will be located at the Lindsay Arsenal, and this plant will manufacture shells, fuses and primers and other items for service training requirements, and manufacture test runs of newly designed heavy ammunition. Like the other divisions it will collect and store machine tools and parts, maintain contacts with manufacturers, and gather and revise drawings

and technical information.

High Explosives and Chemical Div. will be established at the DeSalaberry plant at Quebec, and will be kept in a stand-by condition. Plans have been made for storage of large stocks of explosives and chemicals.

Ammunition Filling Div. will be at the Cherrier plant St. Paul l'Ermite, Que., which plant will store and keep in repair the necessary machine tools and other equipment for filling operations, and will store stocks of explosives left over from World War II. On a small scale it will continue in operation to fill requirements of ammunition for peacetime, and at all time keep abreast of any advance in filling operations.

The Instrument Div. has taken over a block of government buildings and facilities formerly oper-

ated by Research Enterprises at Leaside, Toronto, Ont. The division thus will be in a position to carry on development work, make experimental models and manufacture precision instruments for the Armed Forces. It also will have the task of repairing and reconditioning military instruments, and keeping plans for large scale manufacture of instruments up to date.

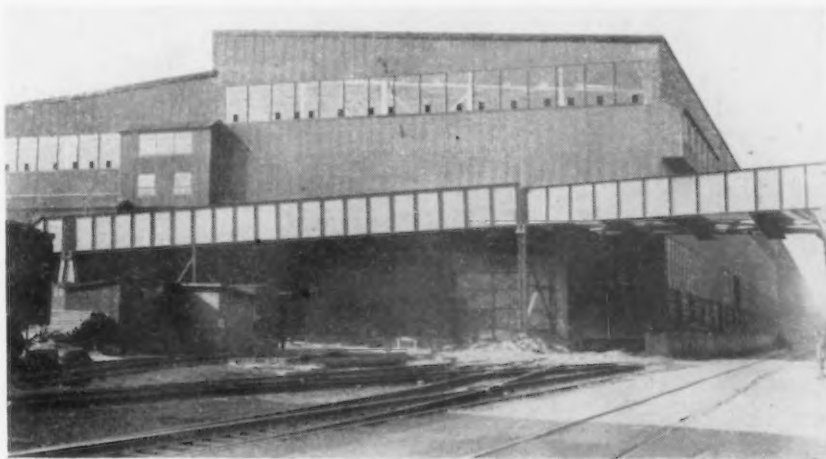
Reports Net Income Rise

Buffalo

• • • The Buffalo Forge Co. reports net income of \$1,010,568 for the year ended November 30, 1945, compared with \$698,669 in the preceding year. Net sales totaled \$25,026,055 against \$28,294,401 in the 12 months ended November 30, 1944.



PROGRESS REPORT: These two pictures taken three months apart show the rapid progress in building an addition to the old rolling mill at the Campbell Works of Youngstown Sheet & Tube. Above can be seen the laying of the foundation and erection of the structural steel. Below is the building nearing completion. The new building adds 144,000 sq ft of floor space and will raise the company's cold-rolling capacity by 200,000 net tons a yr.



Warner & Swasey More Than Doubles Earnings; Expands Product Line

Cleveland

• • • Warner & Swasey Co. has reported net earnings for 1945 of \$1,187,258, as compared with \$502,358 for 1944. Sales for 1945 totaled \$28,305,442, compared with \$23,908,323 in 1944.

Charles J. Stilwell, company president, in a letter to shareholders said Warner & Swasey intends to operate all of its expanded facilities for peacetime production, pointing out that at the end of the war the company had plant capacity approximately double that required for turret lathe demand at that time.

"Two courses of action were possible," said Mr. Stilwell. "We could dispose of our DPC-owned facilities and a portion of the expanded facilities owned by the company and shrink our operations to the size required for the manufacture of turret lathes, or we could add new products, in both the machine tool and allied fields, to the extent required to insure utilization of all our expanded facilities resulting from the war effort.

"As a result, a number of products were started in production by the end of 1945, including two types of textile machinery, a pin drafting machine used in the making of worsteds, a knitting ma-

chine for cotton and rayon yarns and a new grading machine, known by the trade name Gradall."

Mr. Stilwell reported that the first of the knitting machines is being shipped from the company's testing laboratories and that further textile machines are under consideration, implementing the possibility that Warner & Swasey may permanently enter the textile machinery field.

Speaking of the Gradall, Mr. Stilwell said, "We do not anticipate that this will prove an important factor in our total production, but it does utilize certain specialized capacity and skills acquired by us during the war."

Reviewing the year, Mr. Stilwell noted that VJ-Day brought cancellations of practically all subcontracts. However, the Navy instructed Warner & Swasey to complete the contract for Bofors gun drive units. Very few turret lathe orders were cancelled, he said, and from that time to the end of the year, machine tool shipments were at a very satisfactory rate. He seriously questioned, however, whether the company could continue at that rate in 1946.

"It had been anticipated that disposal of government-owned turret lathes in the war surplus would, before this time, have a depressing effect upon our own turret lathe market. Such, however, has not yet proved to be the case and it is due in large measure to the slowness with which govern-

ment-owned machine tools are being released for sale. It must be borne in mind, however, that the full impact of the government surplus disposal program still lies ahead of us. At the present time, this surplus is being sold at a rapid rate."

Cleveland

• • • Warner & Swasey Co., in a move to balance production and assembly of turret lathes and new products, has bought the DPC-built plant it has been using since 1942 from War Assets Corp. for \$330,000.

Negotiations for the purchase had been under way for some time, and announcement came shortly after the statement of company president, Charles Stilwell, in his report to stockholders, that Warner & Swasey was in the process of acquiring the building.

Walter K. Bailey, vice-president, Warner & Swasey Co., said about two-fifths of the building would be used for machining and about three-fifths for assembly work. Designed for heavy manufacturing and heavy assembling, the building is located on approximately two acres of land across from the company's main buildings. It has a total floor area in excess of 100,000 sq. ft.

According to Mr. Bailey, the five bays making up most of the manufacturing space will be used for assembly of knitting machines, assembly of turret lathes, a machine shop, which will be an adjunct to the company's main machine shop, and machine shop for experimental work. At the present time, one bay is being used for storage of War Assets Corp. equipment which is being moved out. This bay, as soon as it is cleared, will probably be used for assembly of pin drafting machines or the Gradall, Mr. Bailey said.

"If and when turret lathe production goes down, it will be removed to the main building across the street," he said.

Warner & Swasey Co. is about to assemble first models of the Gradall and pin drafting machine. Knitting machines are being assembled. The company is also doing some rebuilding at the present time.

On Dec. 7, 1941 the company had 3590 employees. During the war period, 2605 employees entered the armed forces, more than the total of productive workers now employed in the plant.

ATOMIC MOVE: Navy officials discuss with Bikini natives removal of their families and homes to another atoll in order to permit the atomic bomb test in May.



Westinghouse Forum to Honor Founder

Pittsburgh

• • • A science and engineering forum honoring the centennial of the birth of George Westinghouse, has been announced by Gwilym A. Price, president of Westinghouse Electric Corp. The forum will be held in Pittsburgh, May 16 to 18.

The opening session, titled "Science and Civilization" and presided over by Dr. Robert E. Koherty, president of Carnegie Institute of Technology, will include Dr. Isaiah Bowman, internationally prominent geographer and president of the Johns-Hopkins University, and George W. Merck, president of Merck & Co., and special consultant to the War Dept. Dr. Archibald V. Hill, foreign secretary of the Royal Society, England, and recent recipient of the Companion of Honor award, will represent England.

Four aspects of "The Future of Atomic Energy" will be discussed the initial day of the forum in a group headed by Dr. Karl T. Compton, president of Massachusetts Institute of Technology. The group will delve into the biological, chem-

ical, explosive and power possibilities of this new form of energy.

A Nobel Prize winner from Columbia University, Dr. I. I. Rabi, will act as chairman at a dinner that evening at which Mr. Vannear Bush will speak on "Planning in Science." Dr. Bush is president of Carnegie Institute and director of the Office of Scientific Research and Development.

The following morning will be given over to "Biological Sciences," headed by Dr. Hugh S. Taylor, dean of the graduate school, Princeton University. Among the participants will be Dr. Selman A. Waksman, professor of microbiology at Rutgers University. Dr. Frank B. Jewett, president of the National Academy of Sciences, will address a luncheon session of "Horizons in Communications."

A topic close to the life of Westinghouse—transportation—will be headed by Robert P. Russell, president of Standard Oil Development Co., on the afternoon of the second day. Phases to come under discussion are: automotive, aviation, rail, marine and transportation plans in urban areas.

Surplus Plant Leased To Harvey Machine Co.

Washington

• • • Leased by the Harvey Machine Co. for five years, WAC has announced that the aluminum extrusion plant at Los Angeles which was operated by the Bohn Aluminum & Brass Corp., will produce extruded aluminum materials and fabricate aluminum products.

The actual cost of the property amounted to \$8,257,513 and the present estimated fair value is \$5,125,904. The company is leasing the plant at a rental of 4 pct of the net sales on all products produced in the plant with no minimum rentals set for the first and second years and minimum set for the third, fourth and fifth years set at \$200,000, \$300,000 and \$400,000 respectively.

WAC has announced that the following plants are for sale or lease:

Steel foundry, Milwaukee, which

was operated by the Motor Castings Co.

Sperry Gyroscope Co., Nassau County (Long Island) N. Y., modern and efficient, a show-place with 45 acres of buildings. The plant made scientific instruments during the war.

Aircraft assembly plant on Wolf River in Memphis, Tenn., which was operated by General Motors Corp. Plant consists of 8.8 acres and equipment includes 92 machine tool items.

Bids on Geneva Extended

Washington

• • • A further 30-day extension on the opening of sealed bids or proposals for the purchase or lease of the government-owned steel plant at Geneva, Utah, was announced on Mar. 4 by Lt. Gen. Edmund B. Gregory, chairman of the board of the War Assets Corp.

The closing date for sealed bids or proposals has been set as May 1, 1946, at which time offers will

Washington

• • • President Truman's statement issued late on March 4 that his recommendation of an 18½¢ hourly wage increase applied only to the basic steel industry, leaves settling of wage disputes with fabricators and processors to negotiations with USW.

Under regulations of the Office of Economic Stabilization fabricators and processors may grant wage increases up to 18½¢ an hour without prior approval provided such increases are put into effect by March 15. Such action would not constitute any waiver on the part of fabricators and processors to apply for price increases, it was stated at OES. It was disclaimed that the White House statement conflicted with any interpretation of the wage-price order.

be opened at the Washington office of WAC.

Joy Mfg. Adds to Plant

Boston

• • • Sale of the Sullivan Machinery Co., Claremont, N. H., and the Ladel Conveyor & Mfg. Co., New Philadelphia, Ohio, to the Joy Mfg. Co., Franklin, Pa., has been sanctioned by stockholders. Sullivan stockholders will get one and one-quarter shares of Joy stock for each Sullivan held. Of the 186,774 Sullivan shares, Joy already owns 74,467. Joy previously offered to buy Sullivan shares on a cash basis.

Ford Remodels Buildings

Dearborn, Mich.

• • • Ford Motor Co. is remodeling two service parts and stock buildings at the Highland Park plant, spending \$488,000 for the project. Completion is scheduled for the next three months.

The larger of the buildings will be devoted to handling of parts for Michigan Ford dealers. Stock bin layout has been revised incorporating a continuous conveyor system to carry parts from bins to the boxing and labeling department and then on to cages from which dealers will receive delivery.

The other building will be used for delivery of purchased parts and accessories to the various Ford branches and assembly plants throughout the country.

Industrial Briefs...

• **BUYS FOUNDRY FIRM**—Pettibone Mulliken Corp., Chicago, has announced the purchase of the Beardsley & Piper Co. manufacturer of foundry equipment, which will operate as a wholly owned subsidiary of Pettibone, with E. J. Seifert, president.

• **UP FOR SALE**—More than \$5,000,000 worth of material used by the B. F. Goodrich Co., Akron, Ohio, in connection with war contracts, has been declared unsuitable for military use and is being offered for sale by the Cleveland Ordnance District, which has been authorized to act as disposal agent.

• **NEW CONSULTANTS**—Delamar McWorkman, for many years a director and plant manager of Noblitt-Sparks Industries, Inc., Columbus, Ind., has formed a consulting engineering firm, Willard Engineering Co., at Miamisburg, Ohio.

• **JOINS STAFF**—George Bissett, Sr., president of the Bissett Steel Co. and president of Smaller Business of America, Inc., a non-profit organization, looking after the interests of small business firms, recently announced that, to expand their services, S. R. Christophersen has been appointed to an executive position with Smaller Business of America.

• **CHANGE OF ADDRESS** — The general offices of National Electric Products Corp. will occupy the entire 13th floor of the Chamber of Commerce Bldg., Pittsburgh, after May 1.

• **OPENS OFFICES** — Pittsburgh Steel Co. has announced the opening of district sales offices in Philadelphia and Atlanta. The Philadelphia office is in the Broad St. Station Bldg. and the Atlanta office in the 101 Marietta St. Bldg.

• **CANADIAN PLASTIC PLANTS**—Monsanto (Canada) Ltd. Canadian subsidiary of the Monsanto

Chemical Co. is constructing a polystyrene plant whose output will greatly exceed Canada's prewar requirements for this material, according to the company. A considerable portion of the output will be available for export with the remainder going to Canadian markets. It is expected the plant will be in production before the end of this year.

• **PLANT EXPANSION** — The Pittsburgh Corning Corp. has announced plans for a \$300,000 expansion of existing facilities for the manufacture of Foamglas, a glass insulation material, at its Port Allegany, Pa., plant.

• **FORMS TRAILER FIRM**—A new trailer manufacturing company was formed recently in Cincinnati and articles of incorporation were filed for the Currell Trailer Co. listing capitalization of \$100,000.

• **LIQUIDATES COMPANY** — The Jewell Alloy & Malleable Co., Buffalo, has completed arrangements for sale of its physical property and equipment to the newly-formed Kencroft Malleable Co. Ralph T. Rycroft, president of Jewell for the last 10 yr, is head of the Kencroft concern. Jewell stockholders recently voted to liquidate the company because of rising production costs, mainly in the form of wage increases. Purchase price of the \$400,000 plant was not made public.

• **OPENS NEW OFFICE** — Ward Leonard Electric Co., Mount Vernon, N. Y., has announced the establishment of their north Jersey office, Industrial Office Bldg., Newark. R. W. Vonasch, formerly attached to the home office sales engineering dept., is district manager.

• **DISTRICT OFFICE**—The Hepenstall Co., Pittsburgh, has appointed S. J. Mergenhausen as Philadelphia representative with offices located at 1052 Drexel Bldg.

Sharon Steel Acquires By-Product Coke Plant

Sharon, Pa.

• • • Important new facilities have been added to Sharon Steel Corp.'s equipment through the acquisition of a by-product coke plant located in the heart of important coal fields at Morgantown, West Virginia.

This property has been leased from the United States Government for a period of five yr and will be operated to supply coke for the two 800-ton blast furnaces in the company's Farrell works. The coke plant consists of 74 Wilputte ovens with a capacity of 400,000 tons per year and contains all the necessary auxiliary equipment for producing blast furnace coke and various by-products from coke gas. These ovens were built in 1941 and 1942 and were operated during the war as an adjunct to the great chemical works located at Morgantown.

Necessary repairs are now being made and it is expected that the plant will be producing by-product coke in about two and one half months.

In making the announcement Henry A. Roemer, president, stated that the acquisition of this property—together with certain important contracts for raw materials—would make Sharon practically a fully integrated steel producing unit and would greatly strengthen the company's position.

Terms of the lease have not been made public but it is understood that the rental charge will be approximately \$230,000 per year. The plant will be manned by men who were formerly employed there and will be in charge of W. T. Woodman, who has been located on the property since 1941.

Terneplate Tank Order

Philadelphia

• • • The Heintz Mfg. Co. has completed the first seamwelded terneplate gas tank for city bus service on a large order from the J. G. Brill Co., car and truck manufacturer here, a former subsidiary of the American Car & Foundry Co.

The Brill Co. was recently taken over by the Consolidated Vultee Aircraft Co.

Construction Steel...

New York

Following is the complete tabulation of bookings and shipments of fabricated steel for building and bridge construction for the month of January, according to reports received by the American Institute of Steel Construction.

	Estimated total tonnage for the entire industry 1946	Estimated total tonnage for the entire industry average 1936-40
Contracts closed...	211,182	107,578
Shipments	86,371	92,578
Tonnage available for fabrication within the next four months ...	552,135	302,607

• • • Fabricated steel awards this week included the following:

- 2500 Tons, San Diego, miscellaneous structures, Chappo Flats, Camp Joseph H. Pendleton, Navy Dept., through A. Farnell Blair, to Consolidated Steel Corp.
- 2000 Tons, Massillon, Ohio, bridge superstructure, Pennsylvania RR bridge over Tuscarawas River, Mt. Vernon Bridge Co., low bidder.
- 1585 Tons, Detroit, new stripper building and additions to facilities thereto, for Ford Motor Co., to American Bridge Co., Pittsburgh.
- 1100 Tons, Grand Coulee, Wash., nine penstock coaster gates, Grand Coulee Dam, Columbia Basin Project, Bureau of Reclamation, to Consolidated Steel Corp.
- 900 Tons, Lexington, Ky., warehouses for P. Lorillard Co., Bethlehem Steel Co., Bethlehem, Pa.
- 850 Tons, Redding, Calif., four regulating gates for Keswick Dam, Kennett Div., Central Valley Project, Bureau of Reclamation, to American Bridge Co., Pittsburgh.
- 500 Tons, La Crosse, Wis., Northern States Power Co., steam plant addition, to Milwaukee Bridge Co., Milwaukee.
- 450 Tons, Rushville, Ind., International Furniture Co., plant addition, to American Bridge Co.
- 400 Tons, Bangor, Me., two warehouses for Bangor Real Estate Development Co., to American Bridge Co., Pittsburgh, through H. W. Matthews & Son, Bangor, contractor.
- 300 Tons, Madison, Wis., Forsberg Paper Box Co. plant building, to Milwaukee Bridge Co., Milwaukee.
- 290 Tons, Madison, Wis., Soelch Bridge, to American Bridge Co., Pittsburgh.
- 250 Tons, St. Louis, Famous Barr Co., wholesale and delivery building, to Mississippi Valley Structural Steel Co., Decatur, Ill.
- 250 Tons, Miami, Fla., warehouses for Florida Wholesale Grocery Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 200 Tons, Providence, building for Peoples Savings Bank to Utica Structural Steel, Inc., Utica, N. Y., through George A. Fuller Co., Boston, contractor.
- 200 Tons, Orange, Tex., E. I. du Pont de Nemours & Co., project, to Virginia Bridge Co., Roanoke, Va.
- 100 Tons, Detroit, new building for Distel Tool Co., to Sterling Co.
- 100 Tons, Detroit, store and commercial building for M. H. Sobell, to Standard Fabricating Co.

• • • Fabricated steel inquiries this week included the following:

- 6000 Tons, Peoria, Ill., Caterpillar Tractor Co., engine plant.
- 4000 Tons, San Francisco, Bank of America Building.
- 835 Tons, Elizabeth, N. J., express highway bridge in section 32A and 16C, bids rejected by State Highway Commissioner and will be rebid in smaller units.
- 700 Tons, Philadelphia, shop building for Michael Flynn Mfg. Co., Widdecombe Engineering Co., contractor.

- 600 Tons, Compton, Calif., Sears-Roebuck & Co., store building, L. E. Dixon Co., Los Angeles, general contractor.
- 525 Tons, Various Locations, Okla., bridges.
- 403 Tons, Westmoreland City, Pa., Pennsylvania State highway bridge, bids due Mar. 12.
- 320 Tons, Kelseyville, Calif., steel girder bridge across Kelsey Creek, California Div. of Highways, Sacramento, bids due Mar. 27.
- 280 Tons, Salt Lake City, dried pulp bins.
- 280 Tons, Ray Co., Mo., highway bridge.
- 250 Tons, Philadelphia, building for Real Estate Trust Co.
- 210 Tons, Sanderson, Tex., highway bridge.
- 200 Tons, Philadelphia, coal trestle for Reading Co.
- 200 Tons, Worcester, Mass., store alterations for William Filene's Co.
- 160 Tons, Lackawanna City, Pa., Pennsylvania State highway bridge, bids due Mar. 19.
- 150 Tons, Avon, Calif., two railroad bridges, Fluor Corp., Los Angeles, general contractor.
- 125 Tons, Philadelphia, addition to Provident Trust Co.
- 106 Tons, Lackawanna City, Pa., Pennsylvania State highway bridge, bids due Mar. 12.

• • • Reinforcing bar awards this week included the following:

- 2500 Tons, Boston, John Hancock Mutual Life Insurance Co., building, to Truscon Steel Co., through Turner Construction Co., contractor.
- 2150 Tons, Jamestown, N. Y., Russell County, Wolf Creek Dam to Truscon Steel Co., through J. A. Jones Construction Co., contractor.
- 525 Tons, Annapolis, Md., Spa Creek Bridge, through McLean Construction Co., contractors, to Bethlehem Steel Co., Bethlehem, Pa.
- 500 Tons, Washington, Potomac Electric Power Plant, through Stone & Webster, contractors, to Bethlehem Steel Co., Bethlehem, Pa.
- 400 Tons, Milwaukee, Schlitz Brewing Co., building, to W. H. Pipkorn Co., Milwaukee.
- 365 Tons, Glenview, Ill., Harms Rd., sewer, to Carnegie-Illinois Steel Corp., Chicago.

- 350 Tons, Toledo, Ohio, Standard Oil Co., separator tanks, to Carnegie-Illinois Steel Corp., Chicago.
- 300 Tons, Washington, bridge over Anacostia River, through Dravo Corp. to Bethlehem Steel Co., Bethlehem, Pa.
- 250 Tons, Dayton, Ohio, Loose-Wiles Biscuit Co., awarded to unnamed bidder.
- 160 Tons, Kalamazoo, Mich., Allied Paper Co., to Jos. T. Ryerson & Son, Chicago.
- 150 Tons, Los Angeles, Woolworth store, through C. L. Peck, Los Angeles, to Soule Steel Co., San Francisco.
- 127 Tons, San Diego, overcrossing on Route 77 at Richmond Street, California Division of Highways, through M. H. Golden, San Diego, to Soule Steel Co., San Francisco.

• • • Reinforcing bar inquiries this week included the following:

- 2000 Tons, Lackawack, N. Y., Merriman Dam, Delaware Aqueduct, Contract No. 390.
- 900 Tons, Chicago, Velsicol Corp., building.
- 815 Tons, Friant, Calif., miscellaneous bars, Bureau of Reclamation, Denver, bids due Mar. 13.
- 700 Tons, Boston, science building and liberal arts and music building, Boston University.
- 485 Tons, between West Virginia and Kentucky state lines, Dewey Dam, U. S. Engineers at Cincinnati and Huntington, W. Va.
- 290 Tons, St. Louis, Wagner Electric Co., plant addition.
- 250 Tons, Union Village, Vt., dam.
- 201 Tons, San Bernardino Co., Calif., bridge across City Creek, California Div. of Highways, Los Angeles, bids due Mar. 28.
- 190 Tons, Merced Co., Calif., four bridges between Black Rascal Canal and Buhack Station, California Div. of Highways, Sacramento, bids due Mar. 27.
- 109 Tons, Northumberland County, Pa., bridge and paving and grading, RT 161, Sec. 11, RT 161, Sec. 13.

• • • Plate inquiries this week included the following:

- 100 Tons, Worcester, Mass., city gas holders to Chicago Bridge & Iron Co.

Will Build New Plant For Factory-Made Homes

Milwaukee

• • • Production of preassembled homes by the houses division of Harnischfeger Corp., Milwaukee, will be undertaken on a greatly increased scale with erection of a new plant at Port Washington, Wis.

Harnischfeger Corp. entered the preassembled housing field in 1935 when a staff of architects, housing experts and engineers was assembled to conduct extensive research into quality low cost housing. Manufacturing since has been conducted on a limited scale at the company's Milwaukee plants.

The new Port Washington plant, for which construction bids are

being taken, will have a capacity of 2600 houses a year.

Five separate models having two distinct floor plans are currently listed in the Harnischfeger catalog. Erected on conventional concrete or masonry foundations, preassembled wall sections are of stressed skin construction with plywood surfaces permanently bonded to a wood frame. Floors consist of preassembled welded steel frame sections with plywood subfloor attached ready for laying finish floors or floor coverings. Ceilings also are of preassembled steel frame construction, and come ready for applying gypsum wallboard or other ceiling finish. Roof construction embodies factory precision cut wood rafters and plywood sheathing to which wood, asphalt or asbestos shingles can be applied.

MACHINE TOOLS

... News and Market Activities

Labor Disputes, Pricing, Strain Industry

Cleveland

• • • Bolixed by a tight price situation, machine tool builders have little reason to doubt that the demand for 18½¢ hrly wage increases (which have somehow become a symbol of reconversion's collective bargaining) will be upon them en masse and in short order.

Competent observers feel that with wages in some cases 90 pct above Dec. 7, 1941 levels, and the Hendy strike as a possible straw in the wind now in the fifth month,

For other machine tool news, see p. 78.

the industry must of necessity regard OPA as the only functional out; the alternative is closing down the plants.

Other sources feel that OPA is disposed to do something in the way of a price increase, possibly more satisfactory than the flat 10 pct proposal of some time back. Going through the OPA process of questionnaires, etc., however, takes obviously a good deal of time and the interim between the application and the grant may eas-

ily be a period of strained finances for many.

Some builders are reporting about 60 pct of the business they normally expected is coming in, largely the result of strikes which have reached the point where some buyers cannot get into their offices to write the orders—a situation that will soon have some sales managers voluntarily applying for accommodations in a padded cell.

Generally, the report of a month ago seems to prevail, however, that the builders are getting about as much as they are losing to the surplus. This proportion will doubtless change, according to sources in the trade, but it is not likely in the next few weeks.

Considerable disappointment is continually expressed over the activities of War Assets Corp., who by any yardstick, are faced with a terrific job. Many of the alleged inequities in procedure are the result of inexperienced personnel rather than intent, and if some reshuffling should be concomitant with War Assets Administration, the change, according to

Cleveland

• • • Luther A. Sommer, 67, retired president of Sommer & Adams Co., died Saturday, Mar. 2, after an illness of nearly a year. Mr. Sommer was born in Springfield, Ill., and was active in tool, fixture and special machinery manufacture there before coming to Cleveland. In 1919 he organized Sommer & Adams Co., here and managed it actively until a year ago.

A 100 pct stock interest in Sommer & Adams Co. was bought by Federal Machine & Welder Co., Warren, Ohio, early in Jan.

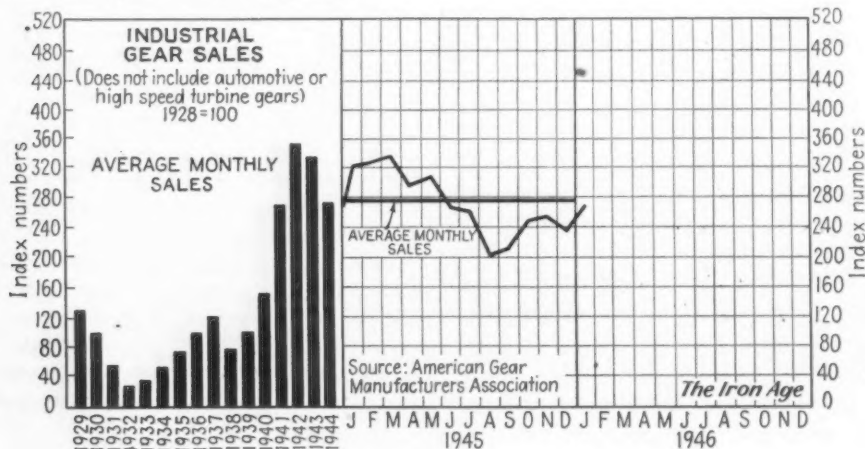
many dealers here, will be for the better.

Much speculation surrounds the almost-secret plans of the armed forces as to the number of machines they will retain in stand-by capacity. One figure of 65,000 has been advanced by one observer, and it is thought that this reserve will consist largely of milling and turning machines.

Directors of the Foote-Burt Co. have voted a dividend of 15¢ per share on common stock, payable March 15 to shareholders of record March 5. This is the same amount as was paid a year ago.

January Gear Sales Increase

... The gearing industry, as represented by the members of the American Gear Manufacturers Assn., shows an increase in volume of sales for January 1946, as compared with December 1945, of 12.6 pct. This report does not include turbine or propulsion gearing. The index figure for January was 269.



Shortages Halt Operations

Boston

• • • Numerous New England machine tool manufacturers have cut operations to the bone, while some have closed temporarily due to a lack of raw material. Still others report deliveries of finished tools have been held up because buyers lacked raw material.

While the establishment of new steel prices by the OPA recently in a way is a great relief to makers and users of tools, the general belief is that it will be the end of March, at least, before raw material shortages will be eliminated sufficiently to permit normal operations.



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NOW any manufacturer, small or large, can take full advantage of the economies of broaching.



When the above part was milled the scrap rate was 40%. When it was given to MICHIGAN for broaching scrap was reduced to a negligible percentage. Also the number of pieces machined per hour was greatly increased. Difficulty was experienced in holding the .002 tolerance when milled. When broached the tolerance was held consistently.

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NONFERROUS METALS

... News and Market Activities

SHG Zinc Pressure Due to Price Ratio

New York

••• Most grades of zinc are in ample supply to meet all requirements, however, Special High Grade is in most active demand and is inadequate for all requirements. Zinc producers point out that the pressure on this grade is due to expanded die casting activities in the current stage of the re-conversion program, and the transfer of many die casting machines from aluminum to zinc production now that the war is over. Automotive consumers represent an appreciable segment of zinc die casting business.

Producers state that another reason for the tremendous pressure for deliveries of Special High Grade in preference to Regular High Grade is caused by the lack of a price differential which would siphon off some of the applications which could make use of the somewhat lower purity metal. The capacity for production of the four-9's metal is insufficient to handle demands from brass mills and foundries, rolling mills and galvanizers, as well as zinc die casting producers. On the other hand, the three 9's metal is suited to the requirements of all the listed consumers except the die casters.

Antimony Tight

New York

••• Antimony is being allocated currently before its production therefore dealers are under the impression that available supplies must be exceedingly tight.

Aluminum Scrap Higher

New York

••• Aluminum scrap has become very scarce since the end of the war and the market has increased appreciably in all grades. On many grades there is a lack of scrap offerings and the market price depends generally on the eagerness of the smelter for sup-

plies of the grade. Among others, these grades include low copper alloys, mixed plant scrap, pure cable; this applies to both solids and turnings.

In the dural alloys, the only available scrap comes from government inventories and the prices are set by the established floor prices for aluminum scrap.

Strikes Unbalance Lead; New Production Looms

New York

••• With the strike in effect at the American Smelting & Refining Co. plants, there is terrific pressure from consumers on other lead producers who, of course, do not have control of any larger stocks now than before the strike began. Producers here estimate that the Mexican strike, recently concluded cost them about 1½ months' lead production. However, the miners are going back to work and shipments have already begun.

The metals reserve stockpile is estimated to contain between 40 and 50,000 tons of lead and the rate of distribution of government lead has been at about 8000 tons per month. Whether the policy of a fixed reduction in the stockpile will be adhered to, in the face of the AS&R strike and the serious lack of world lead supply in the re-conversion program is a question that must soon be determined by Washington.

There has long been a feeling that the world lead position has been gradually deteriorating. There is an optimistic note, however, in the recent report of the Bureau of Mines on the lead production of the Copper Queen mine of Phelps Dodge whose annual production has been increased from 16,000 to 24,000 tons, an appreciable growth. There is also a hopeful sign in new Australian production of lead by the Broken Hill Proprietary Co. Should a price increase permit further exploratory work throughout the world, it is conceivable that additional and perhaps more prolific sources of lead might be uncovered.

Ferro Sales Slow To Reach Prestrike Level

Pittsburgh

••• Ferroalloy sales apparently did not respond as quickly as anticipated following the steel strike, and, while shipments are on the upswing, sales have not reached prestrike levels. The industry is producing close to capacity, and a number of them are still stocking material, because steel mills are not taking it in as fast as it is produced.

The major holdup seems to be the result of jamming of incoming stocks of all types of materials during the strike. Rail sidings were fairly well filled up with material that could not be unloaded during the strike. Until this is cleared up, peak shipping schedules will not be attained.

Remelt Aluminum Price Up

Chicago

••• Increased firmness in the remelt aluminum market, with price advances up to 1½¢ lb, has followed wage advances recently agreed to by local nonferrous smelters.

No. 12 foundry aluminum, No. 2 grade, now is firm at 10.50¢ to 10.75¢ for high grade material. No. 4 deoxidizing aluminum now is quoted at 9¢ by the larger producers with very little available. Deoxidizing grades Nos. 1, 2 and 3 are quoted at 11.75¢, 10.50¢ and 9.75¢ lb respectively, with a firm market at those prices.

Cadmium Control

New York

••• Cadmium continues in short supply and the CPA has been considering the possibility of adopting a stricter control order in which industries are classified as to their essentiality and allotments are authorized on the basis of the classification. The difficulty in working out such a program is in attempting to decide, now that the war is over, on the preferred industries, and who is to exercise the power of decision.

NONFERROUS PRICES

Primary Metals

(Cents per lb., unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb.)	15.00
Aluminum pig	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be.	\$14.75
Beryllium aluminum, 5% Be; dollars per lb. contained Be	\$30.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb.)	\$1.50 to \$1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$ 2.25
Iridium, dollars per troy oz.	\$90-\$100
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	\$103 to \$105
Nickel, electro	35.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per oz.	\$35.00
Silver, New York, cents per oz.	70.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

Remelted Metals

(Cents per lb.)

Aluminum, No. 12 Fdy. (No. 2)	10.00 to 10.50
Aluminum, deoxidizing No. 2, 3, 4	8.25 to 10.50
Brass Ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.35

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	20.37	20.37
Copper, H.R.	17.37	17.37	17.37
Copper drawn	18.37	18.37	18.37
Low brass, 80%	20.40	20.15	20.15
High brass	19.48	19.48	19.48
Red brass, 85%	20.61	20.36	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	15.01	15.01	15.01
Commercial bronze, 90%	21.32	21.07	21.07
Commercial bronze, 95%	21.53	21.28	21.28
Manganese bronze	24.00	24.00	24.00
Phos. bronze, A, B, 5%	36.50	36.25	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculey, Olympic or equal	25.50	26.00	26.00
Nickel silver, 5%	28.75	26.50	26.50
Architect bronze	19.12	19.12	19.12

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 3 in. O.D. x 0.065 in. wall 2S, 40c. (1/2 H); 52S, 61c. (O); 24S, 67 1/2 c.

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28 1/2 c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: 1/4 in., 28 1/2 c. per lb.; 1/2 in., 26c.; 1 in., 24 1/2 c.; 2 in., 23c. Hexagonals: 1/4 in., 34 1/2 c. per lb.; 1/2 in., 38 1/2 c.; 1 in., 25 1/2 c.; 2 in., 25 1/2 c. 2S, as fabricated, random or standard lengths, 1/4 in., 14c. per lb.; 1/2 in., 15c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths, 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2 c.

NONFERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	8.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.00
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.00
Automobile radiators	7.25
Zincy bronze borings	7.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.00
Brass pipe	7.25
Old rolled brass	6.75
Admiralty condenser tubes	7.25
Muntz metal condenser tubes	6.75
Plated brass sheet, pipe reflectors	6.25
Manganese bronze solids	7.00*
Manganese bronze solids	6.00*
Manganese bronze borings	6.25*

OPA Group 4†

Refinery brass	4.50*
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*Price varies with analysis. †Lead content 0.00 to 0.40 per cent. *Lead content 0.41 to 1.00 per cent.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 35 to 90 lb., 56c.; less than 25 lb., 66c.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum*

Plant scrap, segregated

2S solids	9.50 to 10.00
Dural alloys, solids 14, 17, 18, 24S, 25S	6.00 to 6.50
turnings, dry basis	4.50 to 5.00
Low copper alloys 51, 52, 61, 63S solids	8.00 to 9.50
turnings, dry basis	7.00 to 8.50

Plant scrap, mixed

Solids	5.25
Turnings, dry basis	4.00

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	7.50
Old castings and forgings	6.00
Pistons, free of struts	5.00
Pistons, with struts	4.50
Old alloy sheet	5.50

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt Borings and turnings	1.50
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Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	3.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unswaged zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

NI content 98+%, Cu under 1/4%, 23¢ per lb.; 90 to 98% NI, 22¢ per lb. contained NI.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point in 500 lb. lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25 1/2
Electrodeposited	18 1/2
Rolled, oval, straight	19 1/2
Curved	20 1/2
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23 1/2
Zinc, cast, 99.99, 15 in. or longer	16 1/2
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.	80

Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver Cyanide, 100 oz. lots, per oz.	0.6083
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	33.00
Zinc sulphate, 89 per cent, crystals, bbls., frt. allowed	6.35

SCRAP

... News and Market Activities

Scrap Movement Drags; Future Dim

New York

••• Scrap movement throughout the entire country is very slow. This is due to the difficulty encountered by scrap-producing industries in swinging back into full production—resulting primarily from the strikes and lack of steel. Springboards paid by consumers are re-

For other scrap news, see p. 107.

ported in both the Chicago and Pittsburgh areas, the figure in the latter being about \$2. The situation in Cleveland is reported as affecting the smaller consumers mainly, with major consumers in a comfortable inventory position.

Removal of the \$3.50 preparation charge by OPA is already making itself felt. In the Pittsburgh area this ruling is working a hardship on dealers buying and breaking up heavy equipment.

The Canadian market is also very tight. Curtailing of scrap shipments from the United States—in addition to nonreceipt of scrap from rural and farm districts during the past few winter months—has resulted in a SNAFU condition.

Prices continue firm, with no changes reported during the past week.

Dealers express the opinion that an appreciable improvement in the scrap movement will not be felt for at least a couple or more weeks. With the impending coal strike just around the corner, however, restrained optimism prevails.

PITTSBURGH—Scrap supplies in this area are in better apparent balance with demand than in other districts. Mill pressure on supplies is not as great here, mainly because of inventories worked up during the month-long steel strike. Purchases of low phos at premium prices have fallen off to some extent, purchasers holding out for the No. 1 and No. 2 grades. Springboards paid by consumers in this area are around the \$2 figure. The removal of the \$3.50 preparation charge by OPA during the past week will work a hardship on some yards that have been breaking up heavy equipment. Between 7500 and 10,000 tons a month of this material have been handled by

about a half dozen dealers in this area, and already dealers that buy unprepared have retired from the market.

CHICAGO—Shipments from producers continue to be very slow with overall output cut by strikes and reduced operations due to lack of steel. Demand for openhearth grades is unlimited, although unavailability of material has prevented placing of any large orders. Maximum spring boards still can be obtained. No orders have been placed for blast furnace grades for the past three weeks, and output of these grades is extremely limited.

PHILADELPHIA—While dealers continue to report a shortage in scrap of all grades, mills here seem to fear no imminent shortage. One of the large Pittsburgh mills is no longer taking low phos from the Philadelphia area. Luria Bros. was awarded 4400 tons of Navy unprepared scrap, six destroyers—1400 tons at \$14.56, special treatment steel, 3000 tons carbon steel at \$14.01.

DETROIT—The supply of production scrap continues to dwindle here as the result of the General Motors strike, and some sources feel that quantity is at the lowest levels they can remember in many years. Meanwhile, demand continues strong from buyers, although some elements note that the mills are becoming a little fussier about acceptances.

BOSTON—Demand continues well in Philadelphia and Worcester has purchased excess of supply. Charles Dreifus Co., 500 tons No. 1 local navy yards steel at \$15.05 a gross ton; Washburn Wire Co., Phillipsdale, R. I., 400 tons No. 2 steel at \$15.05; Samuel Gordon & Sons, Inc., Chelsea, Mass., 400 tons light steel at \$9.05; and another yard a round tonnage of unprepared steel at \$11.81. A bid for a tonnage of 1½-in. square, listed muck bars was turned down. The lot was sold as billets to a Wareham, Mass., consumer at \$30 a ton. Navy yard will take bids until March 14 on 400 gross tons of steel boxes, presumably ammunition.

NEW YORK—Scrap movement in this area continues to drag. Scrap-producing mills are not picking up as rapidly as was hoped, and the result is that dealers are not receiving supplies to fill the heavy demand. Prices continue firm at ceiling. Luria Bros. has been awarded 5000 tons of landing mat scrap at \$14.56 per gross ton by the Army Third Service Command, Norfolk, Va. Dealers predict that improvement in supplies will be limited within the next two or three weeks, after which time the forthcoming coal strike may take a hand.

BUFFALO—The slow recovery in the district ingot rate has had no effect on

demand for steelmaking grades. Contracts for several thousand tons of heavy melting scrap and machine shop turnings have been placed in the last week at maximum prices. Some specialties are quiet, due to scarcity of offerings and the fact that many foundries have not resumed operations pending more definite information on prices. Railroad lists continue lighter than usual. Some openhearth operators are reported charging a high percentage of hot iron to balance scrap consumption with receipts.

ST. LOUIS—With the settlement of the strike at Granite City Steel Co., shipments of scrap iron which had been held up are now being received, causing a heavier movement although there is no increase in the supply. An unusually strong demand is reported for castings from the grey iron foundries. Prices are strong at ceiling prices.

CINCINNATI—The iron and steel scrap market in this area continues to be tense, with all offerings of both iron and steel scrap being taken, and consumers looking for more. There was no let up in the shipment of scrap during the steel strike, so that no transition occurred in this area. Foundries continue to bid eagerly for all available scrap material, and mills are taking on contract. Prices are at ceiling, with offerings none too plentiful.

CLEVELAND—With most major consumers in this area in a comfortable inventory position, the scrap pinch now is on the smaller consumers, smaller electric furnaces and foundries, that were not out on strike. Some are down as low as a week or ten days' supply. Market conditions otherwise are unchanged; demand is strong and supply limited.

BIRMINGHAM—With practically all items continuing to bring ceiling prices, demand is heavy here for all grades of material. Mild weather has aided collection and preparation, and yards now are able to obtain all labor needed.

TORONTO—The Canadian scrap markets continue in a hndrum state. There has been no improvement in the supply situation and all consumers are in urgent need of scrap, with little prospect of obtaining any sizable stocks until late spring. The rural districts are shut out on account of winter conditions and no deliveries of scrap are being made from farm communities. Also there was slowing down in shipments of industrial scrap in the past week or ten days largely due to curtailed operations in some plants using United States steels.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Roller steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Angles & splice bars	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast.	20.00*
Rails 3 ft. and under	22.25*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	\$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	\$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovellings	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast, chem. bor.	\$13.06 to 14.15*

Truck delivery to foundry

Machinery cast.	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	\$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used on quotations below, this indicates a ceiling price to which must be added brokerage fee and adjusted freight.

Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.82*
No. 1 cupola cast.	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	18.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	\$17.50*
Bundled sheets	17.50*
Mach. shop turn.	12.50*
Locomotive tires, uncut.	\$18.50 to 19.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ry cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	12.80*
Shoveling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	\$18.50 to 19.50*
Structural and plate	18.50 to 19.50*
No. 1 cast	20.00*
Stove plate	19.00*
Steel axles	18.50*
Scrap rails	18.50*
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00
Rails 3 ft. & under	21.00*
Cast iron carwheels	17.50 to 18.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast	20.00*

Hvy. breakable cast	16.50*
Charging box cast	19.00*
Store plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	14.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00*
No. 2 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel.	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	\$15.00 to 15.75
No. 1 hvy. melting	15.00 to 15.75
No. 2 hvy. melting	14.00 to 14.75
No. 2 bales	12.50 to 13.25
No. 3 bales	8.50 to 9.25
Mach. shop turn.	7.00
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$13.00 to \$14.25
No. 2 hvy. melting	12.00 to 13.25
No. 1 bales	12.00 to 13.00
No. 2 bales	11.00 to 12.00
No. 3 bales	8.00 to 9.00
Mach. shop turn.	4.50
No. 1 cupola cast.	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	\$10.00
No. 1 & No. 2 hvy. melting	10.00
Elec. furn. 1 ft. und.	\$14.00 to 15.00
No. 1 cupola cast.	20.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:

Heavy melting	\$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushellings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in Heavy Type; declines in Italics. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel:	Mar. 5,	Feb. 26,	Jan. 29,	Mar. 6,
(cents per pound)	1946	1946	1946	1945
Hot-rolled sheets	2.425	2.425	2.20	2.20
Cold-rolled sheets	3.275	3.275	3.05	3.05
Galvanized sheets (24 ga.)	4.05	4.05	3.70	3.65
Hot-rolled strip				
6 in. and under	2.45	2.45	2.10	2.10
Over 6 in.	2.35	2.35	2.10	2.10
Cold-rolled strip	3.05	3.05	2.80	2.80
Plates	2.50	2.50	2.25	2.20
Plates, wrought iron	4.112	4.112	3.80	3.80
Stain's c-r strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terneplate:	Mar. 5,	Feb. 26,	Jan. 29,	Mar. 6,
(dollars per base box)				
Tinplate, standard cokes	\$5.25	\$5.25	\$5.00	\$5.00
Tinplate, electrolytic	4.75	4.75	4.50	4.50
Special coated mfg. ternes	4.55	4.55	4.30	4.30

Bars and Shapes:	Mar. 5,	Feb. 26,	Jan. 29,	Mar. 6,
(cents per pound)				
Merchant bars	2.50	2.50	2.25	2.15
Cold-finished bars	3.10	3.10	2.75	2.65
Alloy bars	2.808	2.808	2.70	2.70
Structural shapes	2.35	2.35	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.76	4.76	4.40	4.40

Wire and Wire Products:	Mar. 5,	Feb. 26,	Jan. 29,	Mar. 6,
(cents per pound)				
Bright wire	3.05	3.05	2.75	2.60
Wire nails	3.25	3.25	2.90	2.80

Rails:	Mar. 5,	Feb. 26,	Jan. 29,	Mar. 6,
(dollars per net ton)				
Heavy rails	\$43.39	\$43.39	\$43.00	\$43.00
Light rails	49.18	49.18	45.00	43.00

Semifinished Steel:	Mar. 5,	Feb. 26,	Jan. 29,	Mar. 6,
(dollars per gross ton)				
Rerolling billets	\$39.00	\$39.00	\$36.00	\$34.00
Sheet bars	38.00	38.00	36.00	34.00
Slabs, rerolling	39.00	39.00	36.00	34.00
Forging billets	47.00	47.00	42.00	40.00
Alloy blooms, billets, slabs	56.16	56.16	54.00	54.00

Wire Rods and Skelp:	Mar. 5,	Feb. 26,	Jan. 29,	Mar. 6,
(cents per pound)				
Wire rods	2.30	2.30	2.15	2.00
Skelp	2.05	2.05	1.90	1.90

Note: Increased steel prices announced Mar. 1 are retroactive to Feb. 15.

Pig Iron:	Mar. 5,	Feb. 26,	Jan. 29,	Mar. 6,
(per gross ton)	1946	1946	1946	1945
No. 2 foundry, Phila.	\$27.59	\$27.59	\$27.59	\$26.84
No. 2, Valley furnace	25.75	25.75	25.75	25.00
No. 2, Southern, Cin'ti	26.19	26.19	26.19	25.44
No. 2, Birmingham	22.13	22.13	22.13	21.38
No. 2 foundry, Chicago†	25.75	25.75	25.75	25.00
Basic, del'd eastern Pa.	27.09	27.09	27.09	26.34
Basic, Valley furnace	25.25	25.25	25.25	24.50
Malleable, Chicago†	25.75	25.75	25.75	25.00
Malleable, Valley	25.75	25.75	25.75	25.00
L. S. charcoal, Chicago	42.34	42.34	42.34	37.34
Ferromanganese†	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.

Scrap:	Mar. 5,	Feb. 26,	Jan. 29,	Mar. 6,
(per gross ton)				
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke, Connellsville:	Mar. 5,	Feb. 26,	Jan. 29,	Mar. 6,
(per net ton at oven)				
Furnace coke, prompt	\$7.50	\$7.50	\$7.50	\$7.00
Foundry coke, prompt	9.00	9.00	9.00	8.25

Nonferrous Metals:	Mar. 5,	Feb. 26,	Jan. 29,	Mar. 6,
(cents per pound to large buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

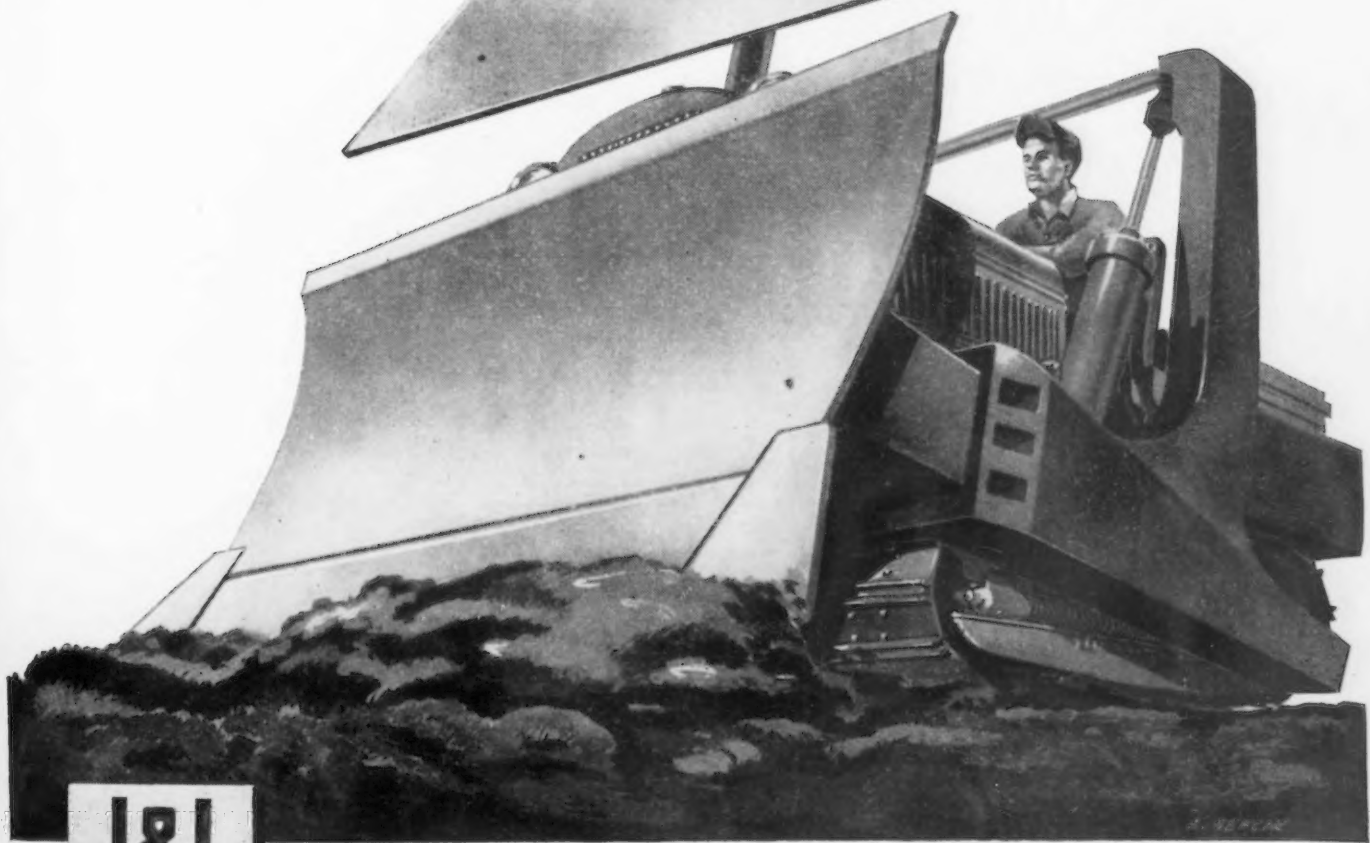
Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

FINISHED STEEL					PIG IRON		SCRAP STEEL			
March 5, 1946.....2.69516¢ per lb.....					.....\$25.37 per gross ton.....		.....\$19.17 per gross ton.....			
One week ago .....2.69516¢ per lb.....					.....\$25.37 per gross ton.....		.....\$19.17 per gross ton.....			
One month ago .....2.44104¢ per lb.....					.....\$25.37 per gross ton.....		.....\$19.17 per gross ton.....			
One year ago .....2.38444¢ per lb.....					.....\$24.61 per gross ton.....		.....\$19.17 per gross ton.....			
HIGH			LOW		HIGH		LOW			
1946.....	2.69516¢	Feb. 19	2.44104¢	Jan. 1	\$25.37	Oct. 23	\$23.61	Jan. 2	\$19.17	\$19.17
1945.....	2.44104¢	Oct. 2	2.38444¢	Jan. 2						
1944.....	2.30837¢	Sept. 5	2.21189¢	Oct. 5	\$23.61		\$23.61		19.17	\$15.67
1943.....	2.29176¢		2.29176¢		23.61		23.61		19.17	\$19.17
1942.....	2.28249¢		2.28249¢		23.61		23.61		19.17	19.17
1941.....	2.43078¢		2.43078¢		\$23.61	Mar. 20	\$23.45	Jan. 2	\$22.00	Jan. 7
1940.....	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30
1939.....	2.35367¢	Jan. 3	2.26689¢	May 16	22.61	Sept. 19	20.61	Sept. 12	22.50	Oct. 3
1938.....	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25	June 21	19.61	July 6	15.00	Nov. 22
1937.....	2.58414¢	Mar. 9	2.32263¢	Jan. 4	23.25	Mar. 9	20.25	Feb. 16	21.92	Mar. 30
1936.....	2.32263¢	Dec. 28	2.05200¢	Mar. 10	19.74	Nov. 24	18.73	Aug. 11	17.75	Dec. 21
1935.....	2.07642¢	Oct. 1	2.06492¢	Jan. 8	18.84	Nov. 5	17.83	May 14	13.42	Dec. 10
1934.....	2.15367¢	Apr. 24	1.95757¢	Jan. 2	17.90	May 1	16.90	Jan. 27	13.00	Mar. 13
1933.....	1.95578¢	Oct. 3	1.75836¢	May 2	16.90	Dec. 5	13.56	Jan. 3	12.25	Aug. 8
1932.....	1.89196¢	July 5	1.83901¢	Mar. 1	14.81	Jan. 5	13.56	Dec. 6	8.50	Jan. 12
1931.....	1.99626¢	Jan. 13	1.86586¢	Dec. 29	15.90	Jan. 6	14.79	Dec. 15	11.33	Jan. 6
1930.....	2.25488¢	Jan. 7	1.97319¢	Dec. 9	18.21	Jan. 7	15.90	Dec. 16	15.00	Feb. 18
1929.....	2.31773¢	May 28	2.26498¢	Oct. 29	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.					Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.				Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.	

JALLOY

THE J&L TANK ARMOR VETERAN—RESISTS HEAVY IMPACTS
AND ABRASION—HAS HIGH TENSILE STRENGTH

Reduce maintenance costs and down-time of your equipment by specifying Jalloy for those parts that must stand heavy wear or are subjected to dynamic forces. Our metallurgical engineers will be glad to discuss your problems. Write for more information.



**J&L
STEEL**

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

Iron and Steel Prices...

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	Detroit	New York	Phila- delphia
INGOTS															
Carbon, rerolling															
Carbon, forging	\$38	\$38	\$38	\$38	\$38	\$38	\$38								
Alloy	\$46.80	\$46.80				\$46.80									
BILLETS, BLOOMS, SLABS															
Carbon, rerolling	\$39	\$39	\$39	\$39	\$39										
Carbon, forging	\$47	\$47	\$47	\$47	\$47										
Alloy	\$56.16	\$56.16				\$56.16									
SHEET BARS	\$38	\$38		\$38		\$38	\$38	\$38							
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢							
WIRE RODS¹⁵															
No. 5 to 5/32 in.	2.30¢	2.30¢		2.30¢	2.30¢										
SHEETS															
Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.525¢	2.425¢		2.975¢	2.525¢	2.665¢	2.595¢
Cold-rolled ¹	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢	3.275¢		3.925¢	3.375¢	3.615¢	3.595¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.15¢	4.05¢		4.60¢		4.29¢	4.22¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢	3.80¢		4.45¢	3.90¢	4.16¢	4.12¢
Long ternes ²	4.05¢	4.05¢	4.05¢									4.80¢		4.41¢	4.37¢
STRIP															
Hot-rolled ³ 6 in. and under 6 in.	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢		2.45¢ 2.35¢			2.45¢ 2.35¢		3.10¢ 3.00¢	2.55¢ 2.45¢	2.81¢ 2.71¢	
Cold-rolled ⁴	3.05¢	3.15¢		3.05¢			3.05¢						3.15¢	3.41¢	
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.91¢	
Commodity cold-rolled	3.20¢	3.30¢		3.20¢			3.20¢						3.30¢	3.56¢	
TINPLATE															
Standard cokes, base box	\$5.25	\$5.25	\$5.25		\$5.35			\$5.35	\$5.35					\$5.604 ¹¹	\$5.53 ¹¹
Electro, box															
0.25 lb	\$4.60	\$4.60	\$4.60					\$4.70							
0.50 lb	\$4.75	\$4.75	\$4.75					\$4.85	\$4.85						
0.75 lb	\$4.90	\$4.90	\$4.90					\$5.00	\$5.00						
BLACKPLATE															
29 gage ⁵	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢			4.30¢			3.57¢
TERNES, MFG.															
Special coated, base box	\$4.55	\$4.55	\$4.55					\$4.65	\$4.65						
BARS															
Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢								
Rail steel ⁶	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢									
Reinforcing (billet) ⁷	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢							
Reinforcing (rail) ⁷	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢								
Cold-finished ⁸	3.10¢	3.10¢	3.10¢	3.10¢			3.10¢								
Alloy, hot-rolled	2.808¢	2.808¢				2.808¢	2.808¢								
Alloy, cold-drawn	3.494¢	3.494¢	3.494¢	3.494¢		3.494¢									
PLATE															
Carbon steel ¹³	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢								
Floor plates	3.75¢	3.75¢													
Alloy	3.64¢	3.64¢													
SHAPES															
Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢									
SPRING STEEL, C-R															
0.26 to 0.50 carbon	3.05¢			3.05¢											
0.51 to 0.75 carbon	4.55¢			4.55¢											
0.76 to 1.00 carbon	6.40¢			6.40¢											
1.01 to 1.25 carbon	8.60¢			8.60¢											
WIRE⁹															
Bright ¹²	3.05¢	3.05¢		3.05¢	3.05¢										
Galvanized															
Spring (high carbon)	3.65¢	3.65¢		3.65¢											
PILING															
Steel sheet	2.65¢	2.65¢				2.65¢									

PRICES

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 448
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	21.25	20.40	15.725	16.15	19.125	23.375
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading.	21.25	20.40	15.725	16.15	19.125	23.375
Billets, P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville.	21.25	20.40	15.725	16.15	19.125	23.375
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville.	25.00	24.00	18.50	19.00	22.50	27.50
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet.	25.00	24.00	18.50	19.00	22.50	27.50
Plates, P'gh, Middletown, Canton.	29.00	27.00	21.50	22.00	26.50	30.50
Shapes, structural, P'gh, Chi.	25.00	24.00	18.50	19.00	22.50	27.50
Sheets, P'gh, Chi, Middletown, Canton, Balt.	36.00	34.00	28.50	29.00	32.50	38.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown.	23.50	21.50	17.00	17.50	24.00	35.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown.	30.00	28.00	22.00	22.50	32.00	52.00
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	25.00	24.00	18.50	19.00	22.50	27.50
Wire flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton.	30.00	28.00	22.00	22.50	32.00	52.00
Rod, h-r, Newark, N. J., Syracuse.	25.00	24.00	18.50	19.00	22.50	27.50
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 6 in.)	66.63	66.63	.....	63.30	.....	.....

SHELL STEEL

	per gross ton
3 in. to 12 in.	\$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic openhearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are \$2.00 higher; East Michigan, \$3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at \$13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of \$52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., net ton	\$43.39
Angle splice bars, 100 lb	2.35
(F.o.b. basing points)	
Light rails (from billets)	\$49.18
Light rails (from rail steel)	48.29
base per lb	
Cut spikes	3.65¢
Screw spikes	5.55¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	4.75¢
Track bolts, heat treated, to railroads	5.00¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk)

	base per lb
(*Also Canton, O.)	
High speed	72.5¢
Straight molybdenum	58.4¢
Tungsten-molybdenum	62.2¢
High-carbon-chromium*	46.5¢
Oil hardening*	26.0¢
Special carbon*	23.8¢
Extra carbon*	19.5¢
Regular carbon*	15.2¢

Warehouse prices east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

CLAD STEEL

Base prices, cents per pound

	Plate Sheet
Stainless-clad	
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	18.00* 19.00
Nickel-clad	
10 pct, f.o.b. Coatesville, Pa.	18.00
Inconel-clad	
10 pct, f.o.b. Coatesville..	25.00
Monel-clad	
10 pct, f.o.b. Coatesville..	24.00
Aluminized steel	
Hot dip, 20 gage, f.o.b. Pittsburgh	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Pacific Coast
Basing Points	Basing Points†
Named	Named

base per keg

Standard wire nails....	\$3.25	\$3.75
Coated nails	3.25	3.75
Cut nails, carloads	3.85	.....

base per 100 lb

Annealed fence wire ..	\$3.50	\$4.00
Annealed galv. fence wire	3.85	4.35

base column

Woven wire fence*	..	..
Fence posts, carloads..	..	..
Single loop bale ties...	..	..
Galvanized barbed wire**	..	..
Twisted barbed wire..	..	..

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

20x14 in. 20x28 in.

8-lb coating I.C.....	\$8.50	\$17.00
15-lb coating I.C.....	9.50	19.00
20-lb coating I.C.....	10.00	20.00

ALLOY EXTRAS

Alloy Steel	Basic Openhearth		Electric Furnace	
	Bars and Bar-strip	Billets, Blooms and Slabs	Bars and Bar-strip	Billets, Blooms and Slabs
NE 8600.....	0.676¢	\$13.52	1.196¢	\$23.92
NE 8700.....	0.728	14.56	1.248	24.96
NE 9400.....	0.780	15.60	1.300	26.00
NE 9700.....	0.676	13.52	1.196	23.92
NE 9800.....	1.352	27.04	1.872	37.44
NE 9900.....	1.248	24.96	1.612	32.24

The extras shown are in addition to the base price of \$2.808 per 100 lb on finished products and \$56.16 per gross ton on semifinished steel, major basing points, as shown in table, opposite page, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. When acid openhearth is specified and acceptable, add to basic openhearth alloy differential 0.25¢ per lb for bars and bar-strip and \$5 per gross ton for billets, blooms and slabs.

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills
(F.o.b. Pittsburgh only on wrought pipe)
base price—\$200.00 per net ton

Steel (buttweld)

	Black	Galv.
1/2-in.	60 1/2	48
3/4-in.	63 1/2	52
1-in. to 3-in.	65 1/2	54 1/2

Wrought Iron (buttweld)

1/2-in.	18	+4
3/4-in.	24	2 1/2
1-in. and 1 1/4-in.	28 1/2	9
1 1/2-in.	33	12
2-in.	32	11

Steel (lapweld)

2-in.	58	46 1/2
2 1/2-in. and 3-in.	61	49 1/2
3 1/2-in. to 6-in.	63	51 1/2

Wrought Iron (lapweld)

2-in.	25	4 1/2
2 1/2-in. to 3 1/2-in.	26	7
4-in.	28	11
4 1/2-in. to 8-in.	27	10

Steel (butt, extra strong, plain ends)

1/2-in.	58 1/2	47 1/2
3/4-in.	62 1/2	51 1/2
1-in. to 3-in.	64	54

Wrought Iron (same as above)

1/2-in.	19	+1 1/2
3/4-in.	25	4 1/2
1-in. to 2-in.	33	13

Steel (lap, extra strong, plain ends)

2-in.	56	45 1/2
2 1/2-in. and 3-in.	60	49 1/2
3 1/2-in. to 6-in.	63 1/2	53

Wrought Iron (same as above)

2-in.	28	8 1/2
2 1/2-in. to 4-in.	34	16
4 1/2-in. to 6-in.	32	14 1/2

On buttweld and lapweld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lapweld and one point lower discount, or \$2 a ton higher on all buttweld.

BOILER TUBES

Seamless steel and lapweld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless	Lapweld, Cold-Drawn	Hot-Rolled
2 in. O.D. 13 B.W.G.	16.52	13.90	13.20
2 1/2 in. O.D. 12 B.W.G.	22.21	18.70	17.67
3 in. O.D. 12 B.W.G.	24.71	20.79	19.56
3 1/2 in. O.D. 11 B.W.G.	31.18	26.25	24.68
4 in. O.D. 10 B.W.G.	38.69	32.56	30.55

(Extras for less carload quantities)

40,000 lb or ft and over.	Base
30,000 lb or ft to 39,999 lb or ft.	5 pct
20,000 lb or ft to 29,999 lb or ft.	10 pct
10,000 lb or ft to 19,999 lb or ft.	20 pct
5,000 lb or ft to 9,999 lb or ft.	30 pct
2,000 lb or ft or 4,999 lb or ft.	45 pct
Under 2,000 lb or ft.	65 pct

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago.	\$60.80
6-in. and larger, del'd New York.	60.20
6-in. and larger, Birmingham.	52.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle.	74.00

For all rail shipment; rail and water shipment less.

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots	Percent Off List
1/2 in. & smaller x 6 in. & shorter.	65 1/2
9/16 & 5/8 in. x 6 in. & shorter.	63 1/2
3/4 to 1 in. x 6 in. & shorter.	61
1 1/4 in. and larger, all lengths.	59
All diameters over 6 in. long.	59
Lag. all sizes.	62
Plow bolts.	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)	
1/2 in. and smaller.	62
9/16 to 1 in. inclusive.	59
1 1/4 to 1 1/2 in. inclusive.	57
1 1/2 in. and larger.	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts U.S.S. S.A.E.

Base discount less keg lots	
7/16 in. and smaller.	64
1/2 in. and smaller.	62
1/2 in. through 1 in.	60
9/16 in. through 1 in.	59
1 1/4 in. through 1 1/2 in.	57
1 1/2 in. and larger.	56

In full keg lots, 10 pct additional discount.

Stove Bolts

Consumer	
Packages, nuts loose.	71 and 10
In packages.	71
In bulk.	80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(1/2 in. and larger)	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham.	\$3.75

Small Rivets

(7/16 in. and smaller)	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham.	65 and 5

Cap and Set Screws Consumer

Percent Off List	
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points.	71
Milled studs.	46
Flat head cap screws, listed sizes.	36
Fillister head cap, listed sizes.	51

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Div. certifies in writing the consumers need for one of the higher grades of metallurgical fluor spar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF ₂ Content:	Base price per short ton
70% or more.	\$33.00
65% but less than 70%.	32.00
60% but less than 65%.	31.00
Less than 60%.	30.00

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, cents per lb, ton lots.

Copper, electrolytic, 150 and 200 mesh. 21 1/2¢ to 23 1/2¢

Copper, reduced, 150 and 200 mesh.	20 1/2¢ to 25 1/2¢
Iron, commercial, 100 and 200 mesh 96 + % Fe.	12 1/2¢ to 15¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots.	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98 1/2 + % Fe, drum lots.	63¢
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe 30 to 33¢	
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe.	42¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe.	90¢
Aluminum, 100 and 200 mesh.	*25¢
Antimony, 100 mesh.	30¢
Cadmium, 100 mesh.	\$1.40
Chromium, 100 mesh and finer.	\$1.25
Lead, 100, 200 & 300 mesh.	11 1/2¢ to 15¢
Manganese.	65¢
Nickel, 150 mesh.	51 1/2¢
Solder powder, 100 mesh. 8 1/2¢ plus metal	
Tin, 100 mesh.	58 1/2¢
Tungsten metal powder, 98%-99%, any quantity, per lb.	\$2.60
Molybdenum powder, 99%, in 200-lb kegs, f.o.b. York, Pa., per lb.	\$2.60
Under 100 lb.	\$3.00

*Freight allowed east of Mississippi.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	\$7.50*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00

Foundry, Byproduct	
Chicago, del'd.	13.75
Chicago, f.o.b.	13.00
New England, del'd.	14.65
Kearny, N. J., f.o.b.	13.05
Philadelphia, del'd.	13.33
Buffalo, del'd.	13.40
Portsmouth, Ohio, f.o.b.	11.50
Painesville, Ohio, f.o.b.	12.15
Erie, del'd.	13.15
Cleveland, del'd.	13.30
Cincinnati, del'd.	13.35
St. Louis, del'd.	13.75†
Birmingham, del'd.	10.90

*Hand drawn ovens using trucked coal permitted to charge \$3.50 per ton plus transportation charges.

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of \$14.25 in the St. Louis, Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Per 1000
Super-Duty Brick, St. Louis.	\$68.50
First quality, Pa., Md., Ky., Mo., Ill.	54.40
First quality, New Jersey.	59.35
Sec. quality, Pa., Md., Ky., Mo., Ill.	49.35
Sec. quality, New Jersey.	51.95
No. 1 Ohio.	45.60
Ground fire clay, net ton.	8.05

Silica Brick	
Pennsylvania and Birmingham.	\$54.40
Chicago District.	62.45
Silica cement, net ton (Eastern).	9.55

Chrome Brick	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester.	\$54.00

Magnesite Brick	
Standard, Balt. and Chester.	\$76.00
Chemically bonded, Baltimore.	65.00

Grain Magnesite	
Domestic, f.o.b. Balt. and Chester in sacks (carloads).	\$43.43
Domestic, f.o.b. Chewelah, Wash. in bulk.	23.00
in sacks.	26.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports*)

	Per Gross Ton
Old range, bessemer, 51.50.	\$4.95
Old range, non-bessemer, 51.50.	4.80
Mesaba, bessemer, 51.50.	4.70
Mesaba, non-bessemer, 51.50.	4.55
High phosphorus, 51.50.	4.85

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

PRICES

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
Philadelphia	\$3.518	\$4.872	\$4.868a	\$3.922	\$4.772	\$3.605	\$3.666	\$3.822	\$4.172	\$5.816	\$6.866	\$7.072	\$8.172
New York	3.59	4.613	5.210	3.974*	4.772	3.768	3.758	3.853	4.203	5.858	6.908	7.103	8.203
Boston	3.744	4.744*	5.324*	4.108	4.715	3.912	3.912	4.044	4.244	6.012	7.062	7.194	8.394
Baltimore	3.394	4.852	4.994	3.902	4.752	3.594	3.759	3.802	4.152	...	...	...	...
Norfolk	3.771	4.965	5.471	4.165	4.865	3.971	4.002	4.065	4.265	...	...	...	...
Chicago	3.25	4.20	5.331	3.60	4.651*	3.55	3.55	3.50	3.85	5.60	6.65	6.85	7.75
Milwaukee	3.387	4.337	5.372	3.737	4.7871*	3.687	3.687	3.637	3.987	5.837	6.887	6.887	8.137
Cleveland	3.35	4.40	4.977	3.60	4.451*	3.40	3.588	3.35	3.85	5.808	6.858	6.85	7.75
Buffalo	3.35	4.40	4.85	3.819	4.669	3.63	3.40	3.35	3.85	5.60	6.65	6.85	7.75
Detroit	3.45	4.50	5.10	3.70	4.6591*	3.609	3.661	3.45	3.90	5.93	6.98	6.959	8.059
Cincinnati	3.425	4.475	4.925*	3.675	4.711	3.681	3.691	3.611	4.111	5.95	7.00	7.011	8.261
St. Louis	3.397	4.347	5.231	3.747	4.9311*	3.697	3.697	3.647	4.131	5.981	7.031	7.031	8.131
Pittsburgh	3.35	4.40	4.85	3.60	4.45	3.40	3.40	3.35	3.85	5.60	6.65	6.85	7.75
St. Paul	3.50	4.48	5.357	3.88	5.1021*	3.811*	3.811*	3.761*	4.261	5.94	6.99	7.361	8.461
Omaha	3.865	5.443	5.615	4.143	...	4.093	4.093	4.043	4.543	...	...	...	...
Indianapolis	3.52	4.568	5.018	3.768	4.741	3.63	3.63	3.58	4.08	5.93	6.98	6.98	8.23
Birmingham	3.45	...	4.85	3.70	...	3.55	3.55	3.50	4.03	...	...	...	...
Memphis	3.965	4.78	5.365	4.215	...	4.065	4.065	4.015	4.53	...	...	...	...
New Orleans	4.058*	5.079	5.458	4.308	...	4.158	4.158*	4.108*	4.729	...	...	...	...
Houston	3.763	5.573	6.4131	4.313	...	4.25	4.25	3.75	4.733	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20	6.20	4.95	5.8131*	4.95	4.65	4.40	5.683	8.204	9.404	9.304	10.454
San Francisco	4.5514	7.304	6.45	4.5014	7.3331*	4.8514	4.3514	4.1514	5.433	8.304	9.404	9.404	10.454
Seattle	4.6512	7.054	6.05	4.2512	...	4.7512	4.4512	4.3512	5.783	...	9.404	...	...
Portland	4.6511	6.604	5.85	4.7511	...	4.7511	4.4511	4.4511	5.633	8.304	9.404	8.304	9.404
Salt Lake City	4.5301*	...	6.2713	5.531*	...	4.981*	4.981*	4.881*	6.00	...	...	...	...

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-FINISHED: Sheets, 400 to 1499 lb; strip, extras on all quantities; bars, 1500 lb base.

GALVANIZED: 450 to 1499 lb.

NE ALLOY BARS: 1000 to 39,999 lb.
EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb and over. (15) 1000 lb and over. (16) 1500 lb and over. (17) 2000 lb and over. (18) 3500 lb and over.

(*) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271¢ for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Maximum per gross ton, established by OPA Oct. 22, 1945. Prices do not reflect 3 pct tax on freight.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	\$26.25	\$26.75	\$27.25	\$27.75		Boston	Everett	\$.50	\$26.75	\$27.25	\$27.75	\$28.25	
Birdsboro	26.25	26.75	27.25	27.75	\$31.25	Boston	Birdsboro-Steelton	4.02					\$35.27
Birmingham	20.75	22.13		26.75		Brooklyn	Bethlehem	2.50	28.75	29.25	29.75	30.25	
Buffalo	24.75	25.75	26.25	26.75	31.25	Brooklyn	Birdsboro	2.92					34.17
Chicago	25.25	25.75	25.75	26.25		Canton	Clev. Ygstin. Sharpsvil.	1.39	26.84	27.14	27.14	27.64	
Cleveland	25.25	25.75	25.75	26.25		Canton	Buffalo	3.19					34.44
Detroit	25.25	25.75	25.75	26.25		Cincinnati	Birmingham	4.06	24.81	26.19			
Duluth	25.75	26.25	26.25	26.75		Cincinnati	Hamilton	1.11			26.86		
Erie	25.25	25.75	26.25	26.75		Cincinnati	Buffalo	4.40					35.65
Everett	26.25	26.75	27.25	27.75		Jersey City	Bethlehem	1.53	27.78	28.28	28.78	29.28	
Granite City	25.25	25.75	25.75	26.25		Jersey City	Birdsboro	1.94					33.19
Hamilton	25.25	25.75	25.75			Los Angeles	Provo	4.95	28.20	28.70			
Neville Island	25.25	25.75	25.75	26.25		Los Angeles	Buffalo	15.41					46.66
Provo	23.25	23.75				Mansfield	Cleveland & Toledo	1.94	27.19	27.69	27.69	28.19	
Sharpville 1	25.25	25.75	25.75	26.25		Mansfield	Buffalo	3.38					34.61
Sparrows Point	26.25	26.75				Philadelphia	Swedeland	.84	27.09	27.59	28.09	28.59	
Steelton	26.25				31.25	Philadelphia	Birdsboro	1.24					32.49
Swedeland	26.25	26.75	27.25	27.75		San Francisco	Provo	4.95	28.20	28.70			
Toledo	25.25	25.75	25.75	26.25		San Francisco	Buffalo	15.41					46.66
Youngstown	25.25	25.75	25.75	26.25		Seattle	Provo	4.95	28.20	28.70			
						Seattle	Buffalo	15.41					46.66
						St. Louis	Granite City	.50	25.75	26.25	26.25	26.75	
						St. Louis	Buffalo	7.07					38.32

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, \$33.00 and \$34.00, respectively. Newberry Brand of Lake Superior charcoal iron \$39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10. Apr. 11, 1945, retroactive to Mar. 7, 1945. Delivered to Chicago, \$42.84. High phosphorus

iron sells at Lyles, Tenn., at \$28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. Effective Mar. 3, 1943, \$2 per ton extra

may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 pct silicon covered by RPS 10 as amended. Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—\$31.25; f.o.b. Buffalo—\$32.50. Add \$1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add \$1.00 per ton for prices of comparable analysis.

FERROALLOY PRICES

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.
 Carload lots (bulk) \$135.00
 Less ton lots (packed) 143.50
 F.o.b. Pittsburgh 139.50
 \$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.
 Briquets—per pound of briquet, freight allowed, 66% contained Mn.
 Eastern Central Western
 Carload, bulk .. 6.05¢ 6.30¢ 6.60¢
 Ton lots 6.65¢ 7.55¢ 8.55¢
 Less ton lots 6.80¢ 7.80¢ 8.80¢

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.
 16-19% Mn 19-21% Mn
 3% max. Si 3% max. Si
 Carloads \$35.00 \$36.00
 Less ton 47.50 48.50
 F.o.b. Pittsburgh, Chicago 40.00

Manganese Metal

Contract basis, lump size, per pound of metal, f.o.b. shipping point, freight allowed.
 96-98% Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.
 Carload, bulk 30¢
 Less ton 32¢

Electrolytic Manganese

* F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
 Carloads 34¢
 Ton lots 36¢
 Less ton lots 38¢

Low-Carbon Ferromanganese

Contract price per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.
 Carloads Ton Less
 0.06% C, 0.06% P, 90% Mn 23.00¢ 23.40¢ 23.65¢
 0.10% max. C, 1% or 2% max. Si... 23.00¢ 23.40¢ 23.65¢
 0.15% max. C, 1% or 2% max. Si... 22.00¢ 22.40¢ 22.65¢
 0.30% max. C, 1% or 2% max. Si... 21.00¢ 21.40¢ 21.65¢
 0.50% max. C, 1% or 2% max. Si... 20.00¢ 20.40¢ 20.65¢
 0.75% max. C, 7.00% max. Si... 16.00¢ 16.40¢ 16.65¢

Silicomanganese

Contract basis, lump size, per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.
 Carload, bulk 6.05¢
 Ton lots 6.70¢
 Briquet, contract basis, carlots, bulk, freight allowed, per lb. of briquet 5.80¢
 Ton lots 6.30¢
 Less ton lots 6.55¢

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, \$45.50 per G. T. f.o.b. Jackson, Ohio; \$48.75 f.o.b. Keokuk, Iowa; \$46.75 f.o.b. Niagara Falls. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

Contract price per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.
 Eastern Central Western
 96% Si, 2% Fe... 13.10¢ 13.55¢ 16.50¢
 97% Si, 1% Fe... 13.45¢ 13.90¢ 16.80¢

Ferrosilicon Briquets

Contract price per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si.
 Eastern Central Western
 Carload, bulk .. 3.35¢ 3.50¢ 3.65¢
 Ton lots 3.80¢ 4.20¢ 4.25¢

Electric Ferrosilicon

Contract price per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.
 Eastern Central Western
 50% Si 6.65¢ 7.10¢ 7.25¢
 75% Si 8.05¢ 8.20¢ 8.75¢
 80-90% Si 8.90¢ 9.05¢ 9.55¢
 90-95% Si .. 11.05¢ 11.20¢ 11.65¢

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.
 Eastern Central Western
 0.06% C 23.00¢ 23.40¢ 24.00¢
 0.10% C 22.50¢ 22.90¢ 23.50¢
 0.15% C 22.00¢ 22.40¢ 23.00¢
 0.20% C 21.50¢ 21.90¢ 22.50¢
 0.50% C 21.00¢ 21.40¢ 22.00¢
 1.00% C 20.50¢ 20.90¢ 21.50¢
 2.00% C 19.50¢ 19.90¢ 20.50¢
 66-71% Cr, 4-10% C ... 13.00¢ 13.40¢ 14.00¢
 62-66% Cr, 5-7% C 13.50¢ 13.90¢ 14.50¢
 Briquets—contract price per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.
 Eastern Central Western
 Carload, bulk .. 8.25¢ 8.55¢ 8.95¢
 Ton lots 8.75¢ 9.25¢ 10.75¢
 Less ton lots 9.00¢ 9.50¢ 11.00¢

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.
 High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.
 Eastern Central Western
 Carload 14.00 14.40 15.00
 Ton lots 14.90 15.55 16.75
 Less ton lots .. 15.40 16.05 17.25
 Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25 max. C.
 Eastern Central Western
 Carload 20.00 20.40 21.00
 Ton lots 21.00 21.65 22.85
 Less ton lots .. 22.00 22.65 23.85

Chromium Metal

Contract prices per pound, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.
 Eastern Central Western
 0.20% max. C... 83.50 85.00 86.25
 0.50% max. C... 79.50 81.00 82.25
 9.00% min. C... 79.50 81.00 82.25

Chromium—Copper

Contract price per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.
 Shot or ingot 45¢

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.
 30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.
 Eastern Central Western
 Carloads 13.00 13.50 15.55
 Ton lots 14.50 15.25 17.40
 Less ton lots .. 15.50 16.25 18.40

Calcium—Manganese—Silicon

Contract prices per pound of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.
 Eastern Central Western
 Carloads 15.50¢ 16.00¢ 18.05¢
 Ton lots 16.50¢ 17.35¢ 19.10¢
 Less ton lots... 17.00¢ 17.35¢ 19.60¢

Calcium Metal

Eastern zone contract prices per pound of metal, f.o.b. shipping point, freight allowed. Add 0.9¢ for central zone; 0.49¢ for western zone.
 Cast Turnings Distilled
 Ton lots \$1.35 \$1.75 \$4.25
 Less ton lots.. 1.60 2.00 5.00

CMSZ

Contract price per pound of alloy, f.o.b. shipping point, freight allowed.
 Eastern Central Western
 Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.
 Ton lots 12.00¢ 12.75¢ 14.75¢
 Less ton lots 12.50¢ 13.25¢ 15.25¢
 Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.
 Ton lots 11.75¢ 12.50¢ 14.50¢
 Less ton lots 12.25¢ 13.00¢ 15.00¢

SMZ

Contract price per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.
 Eastern Central Western
 Ton lots 12.00¢ 12.85¢ 14.60¢
 Less ton lots 12.50¢ 13.35¢ 15.10¢

Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant
 Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed. \$1.33
 Ferrovandium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V...
 Openhearth \$2.70
 Crucible \$2.80
 High speed steel (Primus) .. \$2.90
 Vanadium pentoxide, 88-92% V₂O₅ technical grade, contract basis, per pound contained V₂O₅ \$1.10
 Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti \$1.23
 Less ton lots \$1.25
 Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti \$1.35
 Less ton lots \$1.40
 High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads \$142.50
 Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalled with Rockdale, Tenn., per gross ton \$58.50
 Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton \$75.00
 Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo 95¢
 Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo 80¢
 Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo 80¢
 Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo 80¢
 Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
 Carload lots 14¢
 Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy
 Carload, bulk 4.60¢
 Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload 5.75¢
 Ton lots 7.25¢
 Silmanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound.
 Car lots 8.00¢
 Ton lots 8.75¢
 Less ton lots 9.25¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.
 Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.
 Eastern Central Western
 Less ton lots.. \$1.30 \$1.3075 \$1.329
 Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.
 Ton lots \$1.89 \$1.903 \$1.935
 Less ton lots... 2.01 2.023 2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.
 Less ton lots. \$2.10 \$2.1125 \$2.1445

Silcaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
 Carload lots 25¢
 Ton lots 26¢
 Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
 Carload lots 58¢
 Ton lots 59¢
 Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.
 No. 1 87.5¢
 No. 6 60¢
 No. 79 45¢
 Bortram, f.o.b. Niagara Falls
 Ton lots, per pound 45¢
 Less ton lots, per pound 50¢
 Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.
 Ton lots \$2.25
 Less ton lots \$2.30

Lithium Experts See Bright Future For Lightest Element

New York

• • • New uses for compounds of lithium, lightest of all solid elements, which had been closely guarded war secrets, now are available for industry, speakers at a joint meeting of the American Institute of the City of New York and the American Society of Mechanical Engineers disclosed here recently at a session held at the Engineering Societies Building.

Though lithium is at one end of the periodic table of elements and uranium at the other, lithium may play a spectacular part in nuclear physics investigations in the near future, Dr. Hans Osborg, Vice President and General Manager of the Lithalloys Corporation, said. He pointed to the peculiar characteristics of lithium in the synthesis of other materials.

P. E. Landolt, president of the company, outlined the history of commercial production of lithium.

"Before World War I," he said, "lithium was a rare metal. Progress in the past 20 yr included erection of commercial plants in this country. During World War II, facilities were expanded at least 10 times and commensurate research and development work was carried out, in search of new uses for lithium.

Three lithium products new to industry described by Dr. Osborg include:

1. Lithium peroxide, Li_2O_2 , a solid possessing high stability and providing approximately 35 pct free oxygen by weight.

2. Lithium borohydride, a solid stable in dry air, which generates 66 cu ft of hydrogen per pound, in contact with water.

3. Diborane, a gas at room temperature which liberates 78 cu ft of hydrogen per pound when in contact with water. This gas does not contain lithium, but lithium plays an important part in its production.

"If the oxygen and hydrogen-bearing compounds are considered together with other outstanding organic and inorganic lithium compounds," Dr. Osborg said, "a rather comprehensive picture appears showing lithium as a key

(CONTINUED ON PAGE 134)

GIVE YOUR NEW PRODUCT THE BENEFIT OF . . .

Thomas Strip



UNIFORM COATING
ON INSIDE and OUTSIDE

WITH Thomas Strip
PRECOATED

ELECTRO-COATED ZINC, COPPER

NICKEL AND BRASS . . . HOT DIPPED

TIN AND SOLDER . . . LACQUER

COATED IN COLORS . . . UNCOATED

PRECISION STRIP . . . CARBON AND

ALLOY SPECIALTIES.



The plating of parts is a major and important operation. Difficulties mount as parts become more complicated and when inside finish must be uniform and of high quality.

Precoating of Thomas Cold Rolled Strip Steel at the mill solves these manufacturing difficulties by providing a uniform thickness of brass, copper, zinc, nickel, solder or tin on both sides of the strip. These finishes are carried through to the finished part.

Irregularly shaped parts or deep-drawn cups present no problem of inside coverage when made from precoated ThomaStrip. Nesting of parts in batch plating is entirely eliminated. Every part will have the same high quality finish as all others in production. You have two advantages: economy in production and improved quality for your product.

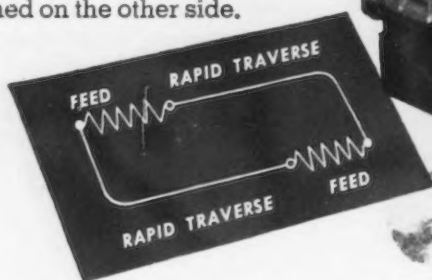
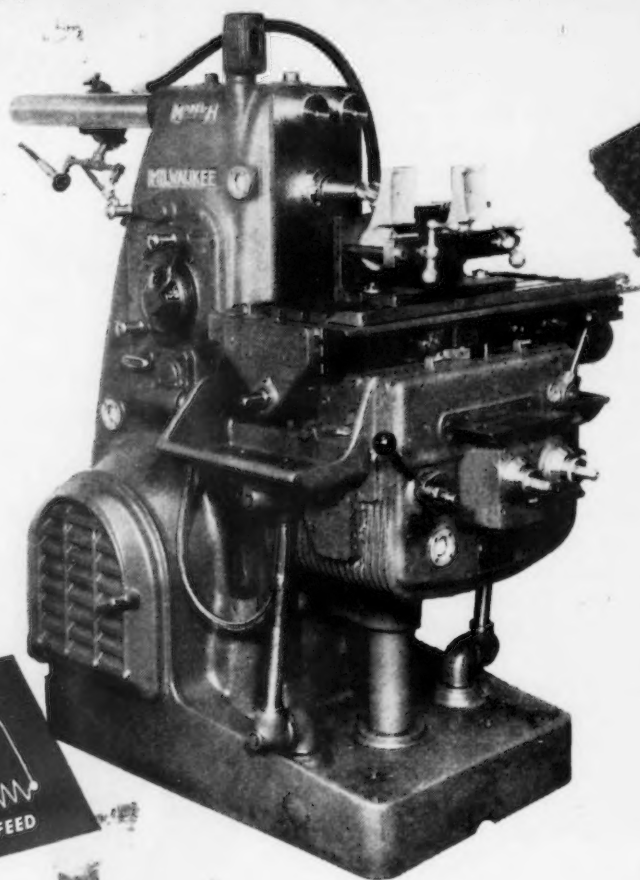
THE THOMAS STEEL CO. · WARREN, OHIO

COLD ROLLED STRIP STEEL SPECIALISTS

★ FAST WORK ON A

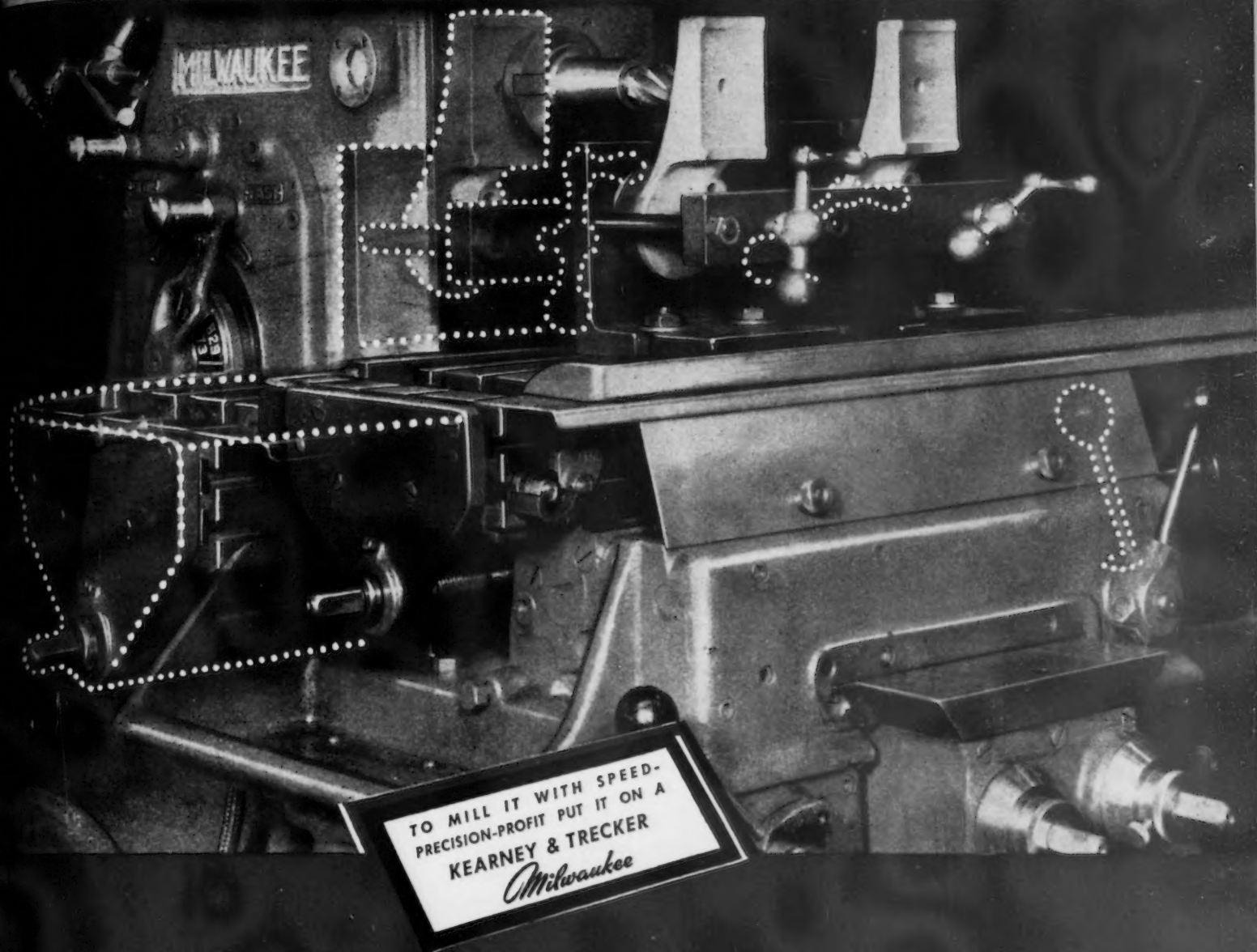
LOW-COST PRODUCTION MILLING OF A WIDE RANGE OF SMALL OR MEDIUM SIZE WORK PIECES

In this operation on a Kearney & Trecker Milwaukee 1H-12" Manufacturing Milling Machine a boss is being milled on the back of a table saddle. A two-station hand clamping fixture is mounted on the table. Continuous table movement in a two-way cutting cycle is governed by the automatic hydraulic control system. The holding fixture is simple and efficient, providing for easy and fast loading as well as unloading and loading on one side of the fixture while the milling operation is performed on the other side.



In the two-way cycle (see diagram) shown above, the table moves at a rapid traverse rate of 150 inches per minute between cuts where the feed rate is 3.5 inches per minute. These cycles are regulated by the machine's automatic hydraulic control system. The cycle can be interrupted by the operator's hand control at any point in the cycle.

A KEARNEY & TRECKER



Ease of operation, accuracy, speed and low-cost-per-piece production are the advantages that make No. 1H 12" and 18" Manufacturing Type Milling Machines so efficient for light milling operations. Extremely versatile, either manually or automatically controlled, they are readily adapted to long or short runs and capable of a diversity of milling operations on light and small or medium sized pieces.

Fast, low-cost production and exceptional

ease of operation are achieved through these Milwaukee design features: complete automatic hydraulic controls for one or two-way cutting cycles; climb cutting screw and adjustable nut for climb milling operations; automatic spindle stop and reverse rate selectors.

Write for complete information on the 1-H Series and the entire Kearney & Trecker line of more than 70 models of milling machines.

KEARNEY & TRECKER CORPORATION
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MODERN PRODUCTION MACHINERY and highly skilled workmen cannot operate at peak efficiency without an adequate, uninterrupted supply of materials. Handling, accounting for nearly $\frac{1}{4}$ of the total production cost, can, if inefficient, effectively retard the rate of production.

OSGOOD MOBILCRANES and GENERAL SUPERCANES, designed to provide maximum efficiency in handling heavy materials, today furnish the swift, economical movement of materials that insures capacity production from men and ma-

chines in many leading industrial plants. Compact and maneuverable . . . MOBILCRANES and SUPERCANES operate efficiently in close quarters; require no special tracks or runways and are easy on floors, thanks to their rubber tires. One-engine operated, one-man controlled, for safe, precise operation that saves time, money and manpower.

See your nearest OSGOOD-GENERAL distributor or write for complete details about swift, economical and safe handling of materials with MOBILCRANES and SUPERCANES!

ONE-MAN CONTROLLED • ONE-ENGINE OPERATED • RUBBER-TIRED

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CRANES - SHOVELS
MARION
OHIO

THE GENERAL EXCAVATOR CO.
SUPERCANES

MARION, OHIO

NEWS OF INDUSTRY

(CONTINUED FROM PAGE 131)

element in chemistry and an important tool in industrial applications.

"The advances made have led to applications in the aircraft, chemical, electrical, engineering, air-conditioning, glass, ceramics, optical and metallurgical industries. Lithium is used as a super-refining agent in metallurgy and as an alloying constituent in low-melting alloys. Lithium compounds are used in fluxes in aluminum welding, making of magnesium castings (lithium salts in fluxes) in the aircraft industry, air purification and air-sea rescue work. In itself, the element is not suitable for use as an engineering material, due to its low strength, extreme softness and high activity with the atmosphere. When added to other metals and alloys, however, it greatly enhances physical properties. In the air conditioning field, the lithium serves to control moisture content and to remove CO₂."

The radio antenna attached to a raft used by fliers downed at sea is held in the air by a hydrogen-filled balloon, he explained. To generate the hydrogen, lithium hydride, in a small metal can, is mixed with sea-water. This new means of producing hydrogen made it possible to dispense with conventional steel cylinders, which weigh as much as a man.

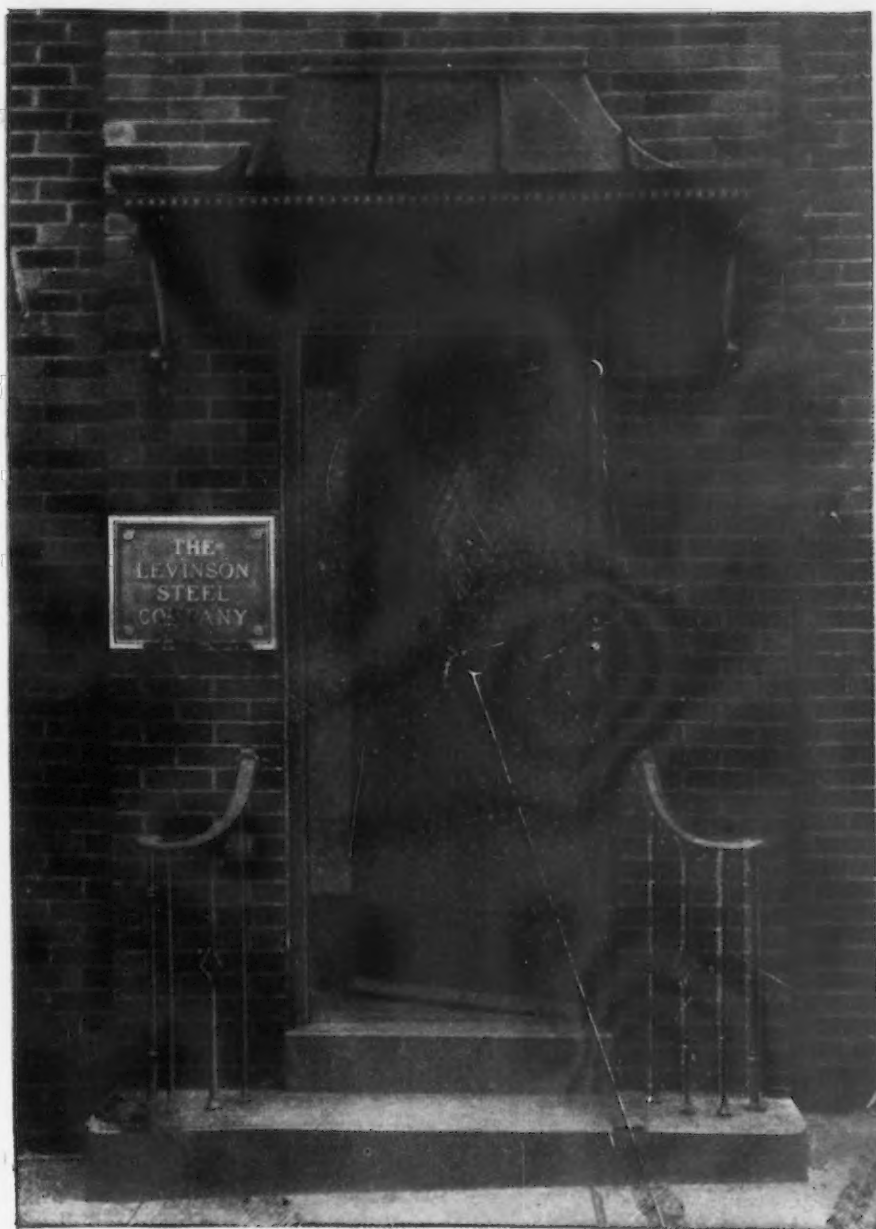
"Lithium also has an important part in nuclear physics," Dr. Osborg said. "In contrast to uranium which is subject to fission or disintegration, lithium can be used for the synthesis of other elements. The reaction of lithium and hydrogen in chemistry produces lithium hydride. The heat of reaction is appreciable.

"Once we learn to use the energy generated in nuclear physics, when lithium is bombarded by a proton, or combined with hydrogen, much greater energy could be produced—in the order of half a million kw-hr for 8 gm."

Magnet Wire Rule Change

Washington

• • • Because of the extreme shortage of magnet wire, CPA has reduced the allowable inventory of this critical product in the hands of consumers from 60 to 45 days, or a practicable working inventory, whichever is less.



... the door that's always open

YES, there may be shortages of vital materials; production and delivery schedules may be interrupted because of conditions beyond our control—but here at Levinson the door is still always open.

For despite unusual conditions that may arise from time to time, we want you to know our organization welcomes your inquiries. We may or may not be in position to take care of your immediate requirements, but be assured of a warm, courteous greeting and a sincere effort to help work out your problems.



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Warehousers — Fabricators

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VIBRATION ABSORPTION
is essential



specify
ABSCO-MEEHANITE
castings

With Absco-Meehanite castings, you can control closely the physical properties demanded by a specific application. For example, if you need a base for a machine tool, such as the Absco-Meehanite casting illustrated, you must have, first of all, vibration absorption in the metal. Yet this property must be combined with the necessary degree of strength and toughness.

Combining the dual characteristics of iron and steel, this Absco-Meehanite casting maintains superior damping at high stress ranges while providing reliable, substantial support . . . promotes smooth, less noisy operation.



If you want unusual castings for unusual service on a production schedule basis, consider Absco-Meehanite castings. In them are combined the experience-based foundry

knowledge, techniques and facilities of American Brake Shoe Company. Write and tell us your casting needs.



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ABSCO-MEEHANITE PROPERTIES

- | | | |
|--|-------------------------|--------------------------|
| 1. Strength (Shear, Compressive, Tensile and Transverse) | 3. Corrosion Resistance | 7. Rigidity |
| 2. Impact Resistance | 4. Wear Resistance | 8. Machinability |
| | 5. Heat Resistance | 9. Pressure Tightness |
| | 6. Toughness | 10. Vibration Absorption |

**Rise in Productivity
Seen as Key to Build
Healthy Economic Life**

Cleveland

• • • Only by increasing the productivity of the individual worker can the United States continue to grow and prosper as it has grown and prospered in the past, according to Clifford F. Hood, president of the American Steel & Wire Co.

In a speech before the Cleveland Engineering Society, Mr. Hood pointed out that during the recent steel strike, somewhere in the neighborhood of eight million manhours of labor were lost at the end of each working day, leaving nothing but a vacuum on the industrial scene.

Emphasizing that this is not the time for name calling or prolonging of disputes, but a time for intensive and whole-hearted joint effort as the steel industry starts the tremendous job of "going back into business," Mr. Hood reviewed for the group a few of the basic facts of steel production.

Confining his discussion to the points that lay in the background of the strike which has just ended, Mr. Hood recalled that since 1900 wage rates of steel workers have multiplied by five. "This has been possible," he said, "because during this same period steelmaking methods have steadily improved. The record of the industry shows that the bulk of the savings from better methods has gone to workers in higher wages and to consumers in lower prices, and how average weekly earnings in the steel industry have climbed from \$33.95 in January 1941, to \$55.83 in the first eleven months of 1945. That was a gain of more than 50 pct. And this does not take into consideration the wage increase provided in the strike settlement.

"Looking at the earnings of our own company, figured percentage-wise, the United States Steel Corp. in 1945 earned less than four pct on its investment. That return meant that the owners received \$60,000,000 in 1945. For comparison purposes, let us go back to 1941. In that year the owners were paid \$60,000,000—exactly the same as in 1945. But how about the workers? In 1941 they were paid \$628,000,000. In 1945 they were paid \$824,000,000. In other words, the earn-

4405

racolloy electrodes

ANSWER THE STAINLESS STEEL ROLLCALL

REID AVERY GRADE	AISI TYPE	MATERIAL TO BE WELDED
RACOLLOY 18-8	308	Unstabilized 18-8 Stainless Steel.
RACOLLOY 18-8 CB	347	Stabilized 18-8 Stainless Steel.
RACOLLOY 18-12 (2-3% Mo)	316	Type 316 Stainless Steel.
RACOLLOY 25-12	309	Type 309 heat resisting Steel and stain-less clad.
RACOLLOY 25-12 CB	309+CB	Type 309 heat resist-ing Steel.
RACOLLOY 25-20	310	Type 310 heat resist-ing Steel & air-hard-ening Steels.
RACOLLOY 19-9	307	Air-hardening Steels.
RACOLLOY 18-8 (1.5% Mo)	None	Air-hardening Steels.

It makes no difference whether stainless steel welding plays a large or small part in your manufacturing process, RACOLLOY Electrodes will net you a profit . . . you can depend on them for excellent results.

RACOLLOY stainless steel electrodes are supplied with three types of coatings: titania type and lime type for direct current, reverse polarity and AC-DC type for alternating current and direct current. The AC-DC type can be used on all types of welding transformers.

We will be glad to send you samples.

The

REID-AVERY COMPANY

INCORPORATED

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SINCE 1919 PRODUCERS OF ARC WELDING ELECTRODES AND WELDING RODS

"PENOLA PRESCRIPTIONS"



THE PROBLEM... A plant was hampered by the occasional stoppage of a roller-bearing conveyor. This conveyor passes through a temperature zone just below 600° F. A light oil was used for lubrication and the extreme heat caused the conveyor bearings to become carbonized.

THE DIAGNOSIS... A Penola Industrial Engineer was called in to remedy this. He noted the formation of carbon on the bearings which indicated the need for a lubricant that would leave no carbon or gummy residue when vaporized, and lubricate the bearings in the hot zone.

THE PRESCRIPTION...

Rx **Van Caloria 50**

applied by an automatic lubricator just before the conveyor first comes in contact with the heat. The Van Caloria is a special high temperature lubricant containing a small amount of colloidal graphite. The oil left no residue and the graphite was present to protect the bearings until more Van Caloria was applied... and for over a year since the application, there have been no shutdowns—another Penola solution representing a saving of time, money and materials!

PENOLA LUBRICANTS

PITTSBURGH, PA. • NEW YORK • CHICAGO • DETROIT • ST. LOUIS



PENOLA PRODUCTS HAVE MEANT EXTRA PROTECTION SINCE 1885

ings of the workers increased more than 30 pct from 1941 to 1945, while the earnings of owners stayed the same.

"Charts showing the steel industry's earnings on investment from 1937 to 1944 indicate no rapid upswing in the last four years, as was the case with workers' earnings. The significant point is that the entire steel industry—over this 7-yr period shown on the chart, reported average earnings of 5.2 pct on investment."

Mr. Hood pointed out that "the principal means by which the public feels developments in steel is by the price the public pays for steel—or for products made of steel. And the best gage of the price of steel is the figure issued by THE IRON AGE on the composite price per pound of finished steel."

He continued, "Over an 8-yr period the price paid for steel did not advance, but during that time earnings of workers showed rapid growth. Which means, of course, that in all this time, until the price increase recently authorized by the government, no part of the cost of the increased earnings of workers was passed along to purchasers of steel—incontestable proof that the public has been well served. The public has been receiving a steadily-improving grade of steel due to the industry's never-ending search for perfect quality, but still there has been no boost in prices at the time that wages have been going upward."

"It will take at least three or four weeks before normal production can be reached, and the flow of steel products from plants returns to its former volume," Mr. Hood estimated, in outlining the industry's immediate problems. He continued, "the immediate problem for basic producers is the lack of coke. There are supplies of iron ore and limestone on hand, but mills have been unable to build stockpiles of coke. So obviously the first problem is to put the coke ovens back into operation."

"The job of the steel industry today is an immense one, and it calls for united effort by every worker in the industry. You may be assured that management is swinging into the job with all the energy at its command, and we are looking for the same kind of spirit from the workers."



NOW -
SELF-RECTIFYING SALT BATHS
for high speed steel !

Houghton announces a new series of salt bath materials for treating high speed steel, which solves the ever-present problem of rectification and prolongs pot and electrode life. Here they are:

PREHEAT—Liquid Heat 1145—A strictly neutral bath which is inhibited against decarburization. Daily make-up maintains neutrality, removing need for chemical rectification. Working range, 1300-1650° F.

HIGH HEAT—Liquid Heat 1550—Rectified by carbon rod anchored in bath; no silicate necessary; pot and electrode life greatly extended. Increased fluidity reduces drag-out and make-up additions. Working range, 1650-2400° F.

QUENCH—Liquid Heat Quench 1138—A salt quench having lower working range (920-1450° F.) which is not affected by carry-over from high heat bath.

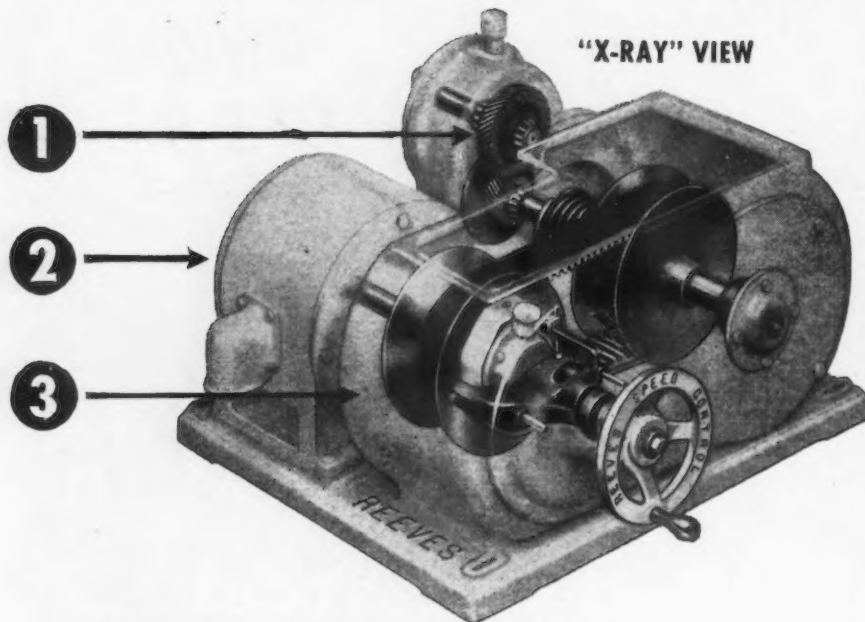
For new folder describing these improved salts for high speed steel treatment, write or phone E. F. HOUGHTON & CO., 303 West Lehigh Avenue, Philadelphia 33, Pennsylvania.

HOUGHTON'S

Liquid **SALT BATHS**

REEVES MOTODRIVE

Wraps up All Three in one compact package



1. GEAR REDUCER: Single, double or triple helical type reduction gears, as required.

2. CONSTANT SPEED MOTOR: Any standard make, ball-bearing, foot-type, may be specified.

3. VARIABLE SPEED MECHANISM: Time-tested REEVES speed varying mechanism for stepless speed adjustability.

● The REEVES Vari-Speed Motodrive is a complete, totally enclosed, accurate variable speed power plant.

Simple, rugged and dependable, the Motodrive drives any production machine at infinitely variable speeds, instantly providing the most efficient speed for every changing condition in processing. Available in space-saving horizontal and vertical types— $\frac{1}{4}$ to 15 hp., and in speed ratios 2:1 through 6:1.

Install REEVES Motodrives and secure immediate and continuous economies in machine operation. Productive capacities of men and machines are often doubled. For full information on REEVES Variable Speed Control units—Motodrive, Transmission and Motor Pulley—send for 96-page catalog I-450.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Recognized Leader in the Specialized Field of Speed Control Engineering

Accurate Variable
REEVES Speed Control
Gives the Right Speed for Every Job!

NEWS OF INDUSTRY

Canadian Shipbuilding Facilities Hold Peak Production in 1946

Montreal

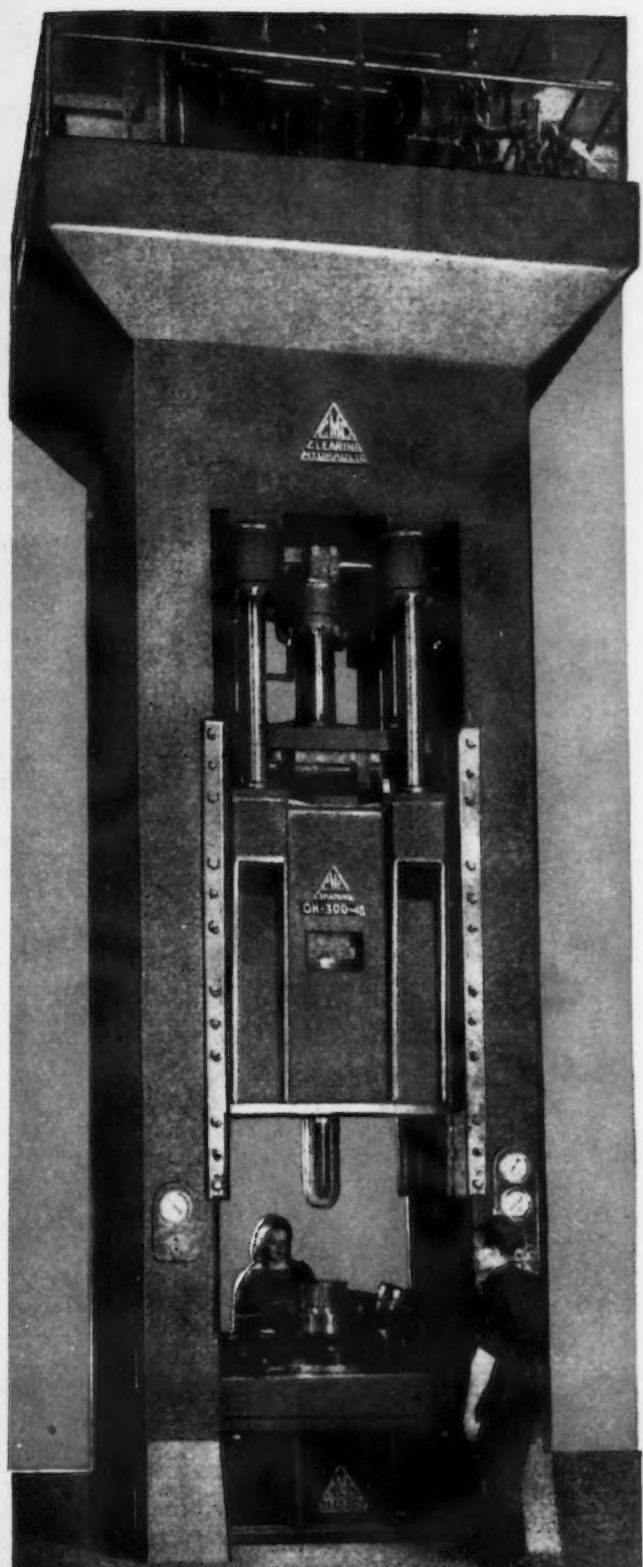
• • • Several Canadian shipbuilding companies are now assured of sufficient business to keep their yards in full operation throughout this year and some well into 1947, as a result of orders placed by Canadian companies and for the French government.

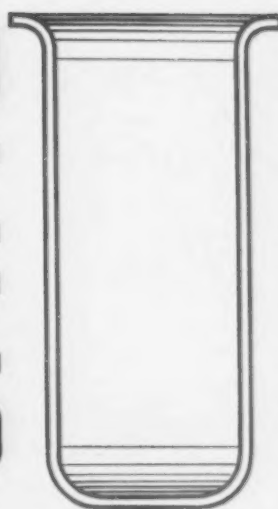
Canadian National Steamships has placed contracts for three diesel-driven cargo ships, R. C. Vaughan, president of Canadian National Railways, announced. Canadian Vickers Ltd., Montreal, will build one of the ships while the others will be constructed by Davie Shipbuilding Co., Quebec, and Burrard Shipbuilding Co., Vancouver, B. C. The cargo ships will be 7000 tons deadweight.

Shipbuilding contracts involving expenditure of approximately \$7,000,000 are pending for British Columbia shipyards from Canadian Pacific and Canadian National Steamship lines. The orders will include two new coastal passenger ships for the C.N.R., to cost \$2,500,000 each, and the construction of new tugs for C.P.R. coastal work, while the remainder of the contracts will cover reconversion and repairs to other C.P.R. ships.

Canada has sold 64 of its war-time fleet of freighters built in the Dominion, and has chartered 41 others, C. D. Howe, Minister of Reconstruction, announced. There remains about 23 still to be disposed of. Mr. Howe stated "we could have disposed of them all by this time, but we are trying, as far as possible, to keep them all under Canadian ownership." He made it clear that Canada has no thought of operating any of them as a publicly-owned merchant fleet.

Mr. Howe also revealed that Canadian shipyards now are working on a \$40,000,000 shipbuilding program, in addition to private orders which amount to a considerable amount more. When the war ended there were 40 ships under construction and these are being finished. In addition Canada is building eight 7200-ton cargo ships for France as well as 80 barges of 150-ton size for France to be used in Indo-China, while France also has ordered 15 trawlers.



**D
E
E
P**  **D
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W**

To Meet Rigid Specifications

True test of the soundness of press design is found in deep drawing operations . . . particularly those where wall thickness dimensions must be maintained to close tolerances. Travel of the ram must take place with extreme accuracy. The slightest deflection most often means rejected work.

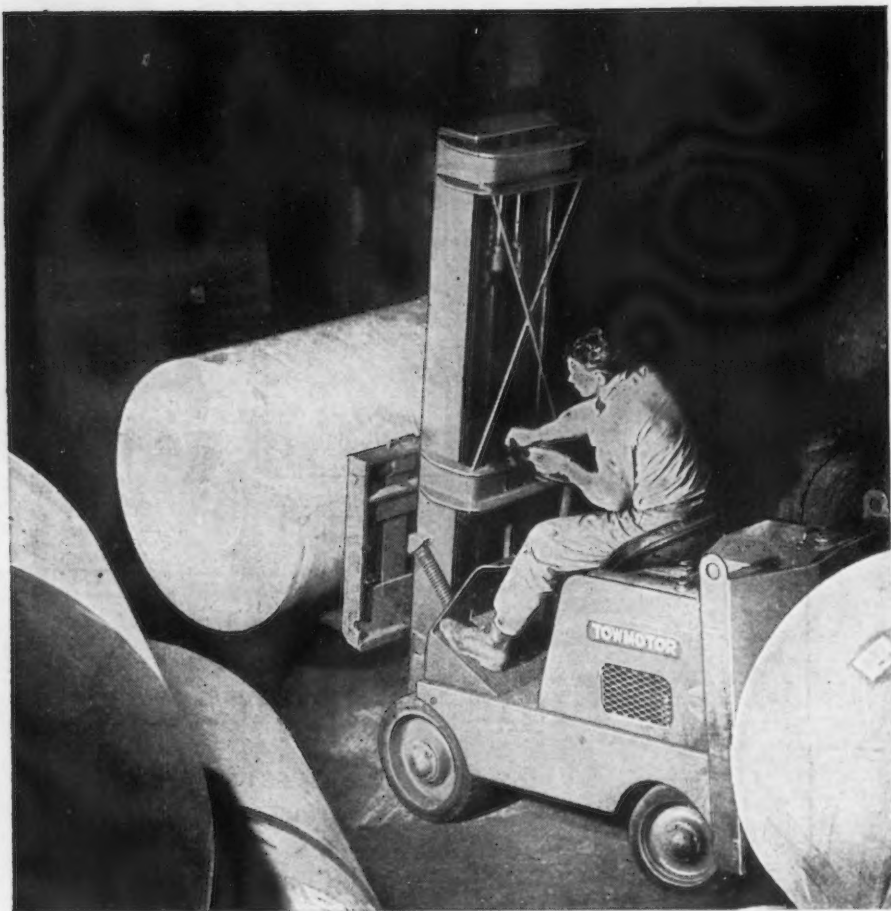
In deep drawing operations like these, Clearing Presses have always excelled. Unsolicited letters of recommendation from shops throughout the nation bear testimony to the "something extra" of Clearing Press design and construction. Illustrated here is one type of Clearing deep drawing press . . . a 300-ton Hydraulic Four-Point-Suspension Press.

In addition to providing accuracy, Clearing can also always give the advantage of operating speed and ease. You are invited to write for the facts about Clearing Presses. An outline of your work requirements will permit us to make recommendations specific to your needs.

CLEARING MACHINE CORPORATION
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CLEARING ★





Raising Wages To Lower Costs

IN THE COURSE of expanding their Cleveland plant facilities The Hinde & Dauch Paper Company, manufacturers of corrugated boxes, turned twenty-seven years of Towmotor materials handling experience and "know-how" to their own fullest advantage. As a result, Hinde & Dauch improved their method of handling large, bulky rolls of fibre board by installing a Towmotored handling system.

In addition to solving their handling equipment problem Hinde & Dauch achieved another important improvement. Because of the new system one man operating a Towmotor unloads, transports, stacks and delivers rolls weighing 1500 lbs. to 4,000 lbs. each, totalling 90 tons per day. Since he is paid on a tonnage basis the Towmotor operator actually earns more money than under the previous method although the cost of handling has been

appreciably reduced. This "pay increase" is possible because flexible Towmotor can transport and stack 3 to 6 foot long rolls anywhere in the plant without extra manual handling. In many of the other Hinde & Dauch plants throughout the country the Towmotor method has already been adopted.

For every handling problem there is an engineered solution a solution based upon Towmotor experience and "know-how" gained in solving handling problems in every industry. Send for your copy of the Towmotor Lift Truck ANALYSIS GUIDE today. Towmotor Corporation, 1230 East 152nd Street, Cleveland 10, Ohio.

TAKE IT UP WITH
TOWMOTOR
THE ONE-MAN-GANG

NEWS OF INDUSTRY

Barium Steel Corp. Acquires Control Of Republic Industries

New York

• • • Barium Steel Corp. has acquired control of Republic Industries, Inc., according to announcement made to stockholders recently. It is the fourth acquisition made by Barium Steel in the last 18 months.

With the acquisition of Republic Industries the Barium now controls ten operating companies with two plants in Cleveland, and plants in Canton, Ohio, Duluth, Detroit, Erie, Pa., Syracuse, N. Y., Pottstown, Pa., and Toronto. They produce materials and equipment in demand by the automobile, airplane, agricultural equipment, housing and construction companies, and other leading industries.

The companies now taken over by Barium through Republic Industries include: Jacobs Aircraft Engine of Pottstown, Pa., manufacturer of engines for airplanes and automobiles as well as hydraulic equipment for builders of farm and material-handling equipment, including the machine tool industry.

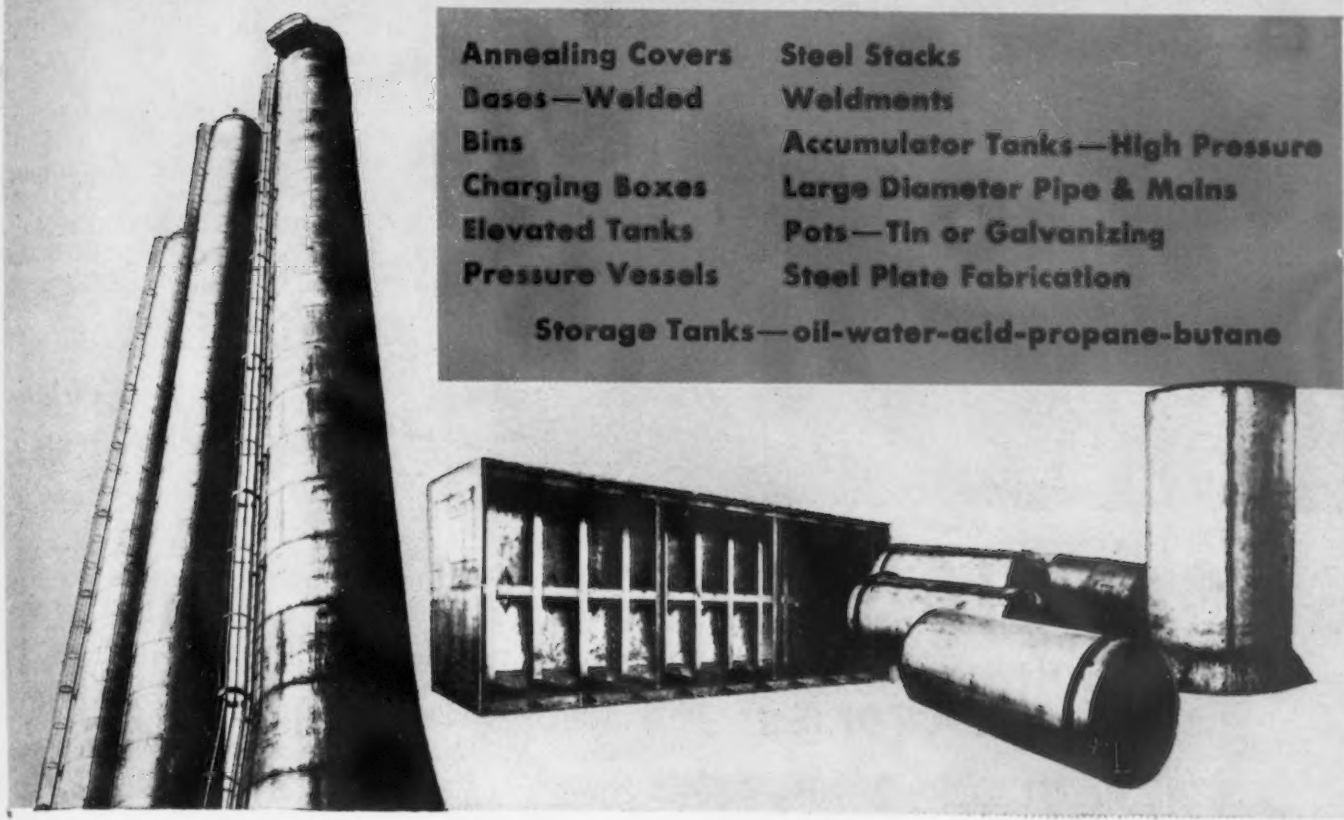
Kermath Mfg. Co. of Detroit, makers of marine engines including industrial and stationary engines.

Geometric Stamping Co. of Cleveland, fabricates a line of specialty stampings, principally for the automotive trade and furnishes stampings for office equipment as well as for washing machines and many other appliances.

Porcelain Steels Co. of Cleveland, produces fabricated metal products in demand by construction and other industries. The Perma-Jack Corp. of Cleveland, a wholly-owned subsidiary of Republic Industries, is a sales company which markets exclusively the products of Porcelain Steels.

Under an exclusive contract, the Industrial Hydraulic Corp. of Painesville, Ohio, designs and distributes industrial hydraulic equipment manufactured by the Jacobs Aircraft Engine Co. The Kermath Mfg., Ltd., of Toronto, Canada, also come under control of Barium Steel Corp. through

PLANNING REPLACEMENTS



Annealing Covers	Steel Stacks
Bases—Welded	Weldments
Bins	Accumulator Tanks—High Pressure
Charging Boxes	Large Diameter Pipe & Mains
Elevated Tanks	Pots—Tin or Galvanizing
Pressure Vessels	Steel Plate Fabrication
Storage Tanks—oil-water-acid-propane-butane	

There is no substitute for experience

Many outstanding steel mills are now using General American plate fabricated equipment which has rendered long and satisfactory service.

Much of this equipment was precision fabricated from drawings and specifications submitted by the customer. Some of this equipment was designed, fabricated and installed entirely by this organization.

Regardless of whether you want us to engineer and design the equipment, or you design the equipment yourself and have us fabricate it to your specifications, General American is equipped to do a good job.

You will be working with an organization which has the knowledge, experience and shop facilities to produce equipment for superior performance.

General American

TRANSPORTATION CORPORATION

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SEMISILICA BRICKS

DURATION OF HEAT AFFECTS REFRACTORIES

Following statements are based on temperature range from 2200° F to 2700° F.

SHORT DURATIONS OF HEAT

Furnaces with daily or shorter firing cycles usually require a good clay or super duty brick.

MODERATE DURATIONS OF HEAT

Furnaces with firing cycles of days, weeks or months require refractories which will not vitrify, shrink or spall, from the prolonged heats.

RM SEMISILICA BRICKS are made for this service. The picture at the right shows the results of 24 hours at 2650° F. on a First Quality Clay Brick and the almost unaffected RM.

LONG DURATIONS OF HEAT

Furnaces, intended to be run continuously can safely be lined with **RM SEMISILICA BRICKS**, provided the face temperature of the lining is below 2700° F. While silica bricks are ideal for continuous heats, a furnace may have to be shut down, which is hard on Silica Bricks, but **RM SEMISILICA BRICKS** take it easily.

Note. Some slags and gases attack refractories, so if in doubt, please ask or write for recommendation for your furnaces.



Compression, vitrification and spalling of First Quality Clay Brick, and relatively unaffected RM Semisilica brick after a run of 24 hours under heat and load.

In STEEL MILLS:

For Heating, Reheating, Annealing and Heat Treating Furnaces, OH Regenerators, Blast Furnace Stoves, Soaking Pits, etc. In the roofs, where spalling failure is most prevalent, they perform their greatest service.

In MANY INDUSTRIES:

Such as Chemical, Ceramic, Zinc Smelting and other industries where continuous heats in the temperature range of RM's are required for their processes.

RICHARD C. REMMEY SON CO.
PHILADELPHIA 37, PA.

REMMEY

their affiliation with Republic Industries, Inc.

Other producing and manufacturing companies controlled by the Barium Steel are the Barium Steel & Forge, Inc., of Canton, Ohio, the Clyde Iron Works, of Duluth, Minn., the Erie Bolt & Nut Company of Erie, Pa., and Globe Forge, Inc., of Syracuse, N. Y.

CED Plans Expansion Of Activity in Field Of Economic Research

New York

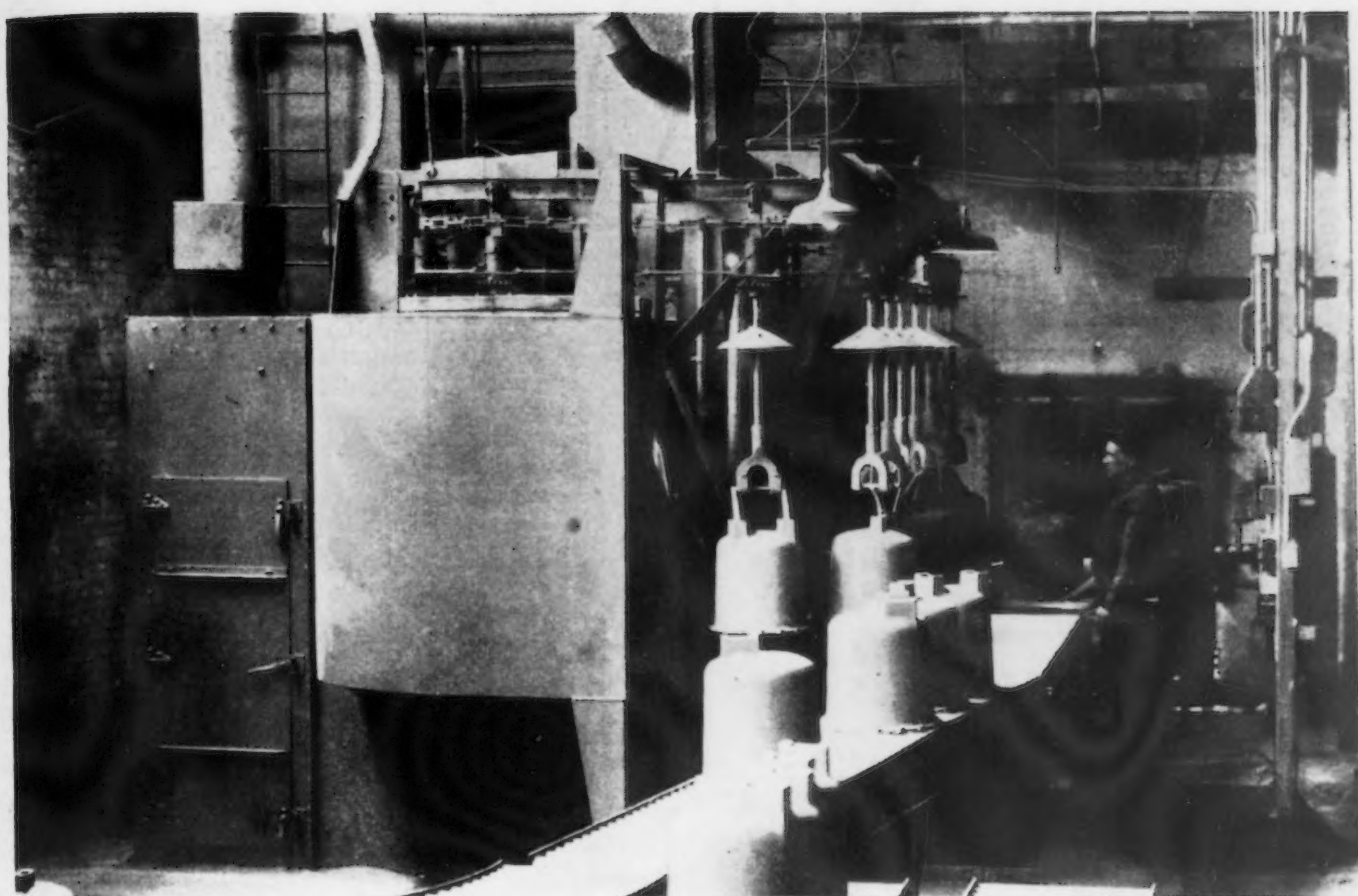
• • • Speeding up and expansion of the activities of the Committee for Economic Development Research Div. and the termination of the work of its national Field Development Div. was announced by Paul G. Hoffman, CED chairman. Many of the community CED organizations will continue to function as independent groups until their programs are completed. Mr. Hoffman said:

"CED was organized in September, 1942, to assist in the achievement of a record-breaking level of production and employment in the postwar period. To meet that objective, a double-barreled program of action was initiated.

"First, the field development program was started and carried forward to stimulate and assist individual employers, community by community and company by company, to plan courageously during the war for quick reconversion, expanded peacetime production and distribution.

"Second, a research program was organized which called for objective study on the part of nationally prominent economists and businessmen of those policies of Government and business which bear importantly upon our economic life, with a view to discovering those changes necessary to provide a business climate which would encourage business expansion.

"In meeting its responsibilities, the Field Development Division organized more than 2900 county and community CEDs with more than 70,000 businessmen as members. The members of this large task force personally contacted hundreds of thousands of large and small employers.



WHEELABRATOR

solves the most difficult cleaning problems

When work to be cleaned is of unusual size, shape or weight, or when special production requirements prevail, an Airless Wheelabrator Special Cabinet is the economical and efficient answer to the problem. AMERICAN has made a specialty of designing special machines.

Special Wheelabrator Cabinets are designed to completely expose the work to the blast of one or more Wheelabrator units so that all areas to be reached by the blast stream are perfectly cleaned.

The success of AMERICAN special designs and the preference accorded them by the trade is due to these two important factors: (1) our designing engineers are able to draw upon a rich fund of practical metal cleaning experience by reason of their having dealt with practically every type of cleaning problem; (2) the design of the machine is preceded by thorough studies of the cleaning problem, both at the customer's plant and in our factory testing laboratory.

By so doing, every important design factor can be accurately checked in advance, such as: the position of the Wheelabrator unit in relation to the work; the size

and speed of the Wheelabrator; the method of conveying the work through the blast stream to obtain proper exposure of all areas; the duration of exposure; etc. When the answers to these problems are obtained the work of the designing engineer is greatly simplified.

When you have a perplexing or difficult cleaning problem bring it to AMERICAN. Our engineers will be glad to give you the benefit of their recommendations without the slightest obligation to you.



WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT



To Avoid Destructive Machine Vibration Consult KORFUND...

Vibration transmitted from one machine to another and to the building structure can be a highly destructive operating force that prevents efficient machine arrangement and causes building damage, machine breakdowns, accidents, spoiled work and lowered employee efficiency.

Vibration control can be effected with isolator units designed of cork, rubber, steel springs or a combination of those materials. For over forty years The Korfund Company has specialized in engineered vibration control units to meet all conditions and every type of installation and operation.



Korfund Type LK Vibro-Isolator is one of the many Korfund units that efficiently eliminate vibration transmission. Ask for a Korfund Vibration Control Engineer to recommend the proper isolators for your equipment, and write today for complete information.

Korfund Type LK Vibro-Isolator shown at left is of steel spring construction with resilient chocks at the corners as stabilizers. These inserts can be adjusted to the correct amount of damping for the individual installation.



KORFUND

VIBRATION CONTROL

THE KORFUND COMPANY, Inc., 48-35 32nd PL., LONG ISLAND CITY 1, NEW YORK

Wallace Sees Business Sharing Risks to Make Foreign Trade Gainful

Chicago

... Business must finance about \$8 billion in world trade during a 3-yr postwar reconstruction period if the basic needs of potential customers are to be met, Henry A. Wallace, Secretary of Commerce, told the Chicago World Trade Conference, conducted by the Chicago Assn. of Commerce and the Export Managers Club of Chicago here last week.

Secretary Wallace cited a study by the office of international trade of the Department of Commerce showing needs for goods of about \$150 billion for the 3-yr period.

"If the United States were to meet the tremendous world import requirements for our products, our exports would average \$14 billion a year—or about the same rate as our peak volume of exports during the war," he said.

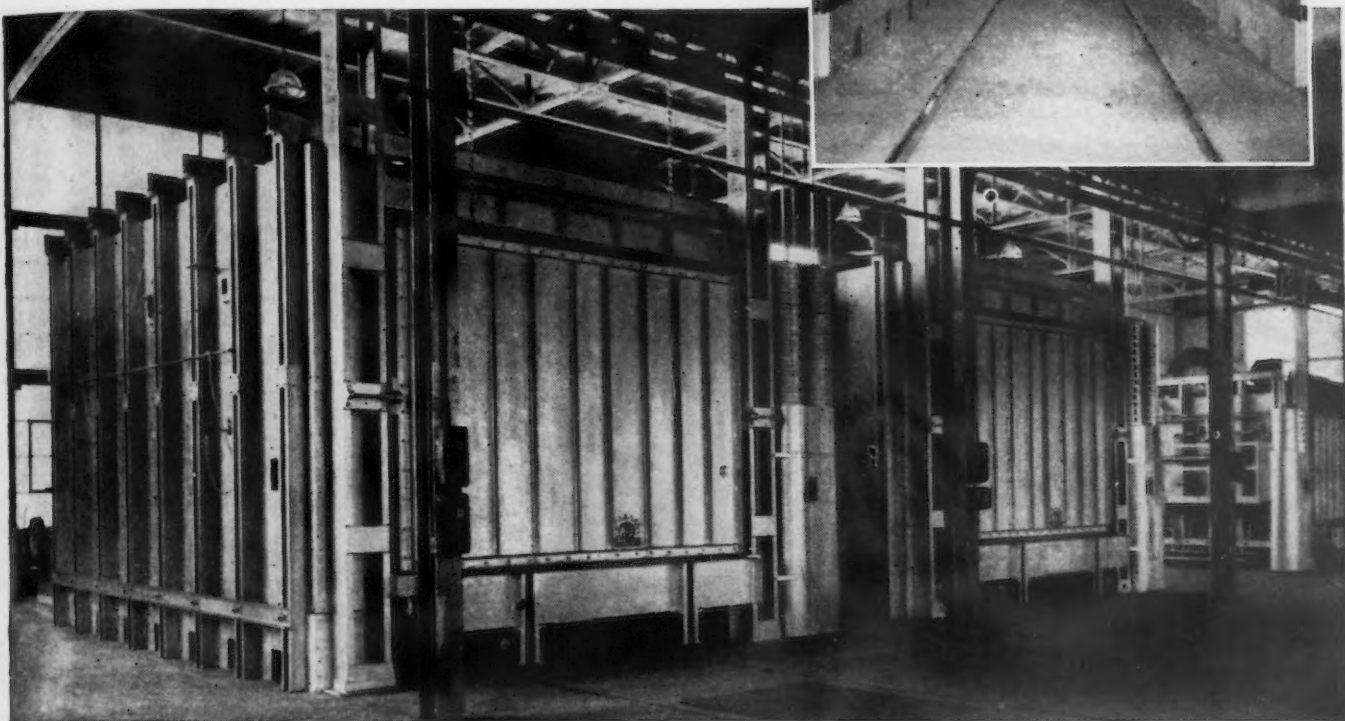
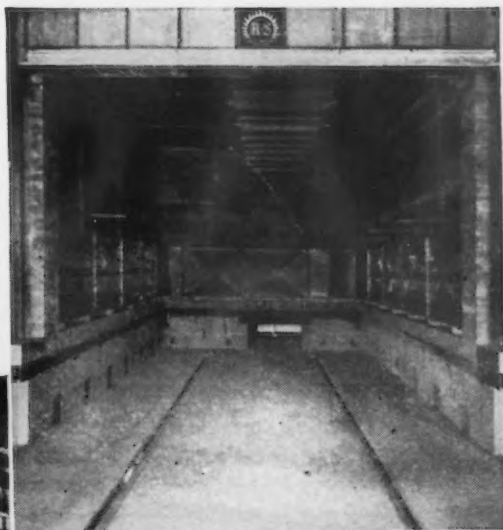
The projected trade deficit of countries importing more than they export for the 3-yr period would total around \$51 billion, he estimated, of which resources are possibly available to these countries for financing about one third. Another \$16 billion would be accounted for through the operations of the international agencies—the relief and rehabilitation work of UNRRA, and the lending and monetary stabilization operations under the Bretton Woods agreement. Of a possible 3-yr total of \$15 to \$20 billion that would require other financing to meet basic needs, countries with a favorable trade balance would account for around \$3 billion, leaving between \$12 and \$17 billion still to be provided. This amount, he said, would have to be financed in the United States because it is the only country with available funds and because it would supply the great bulk of the needed capital and consumer goods. Export-Import Bank lending authorization has been increased to \$3.5 billion, and the British loan now up for congressional approval amounts to \$3,750,000,000, leaving the balance to be financed privately.

"For my part, I question whether it is wise for business to look to the federal government for

U. S. NAVY

Furnace Installations

NAVAL ORDNANCE PLANT, YORK, PENNA.



Typify R-S Rugged Construction



General Offices: Philadelphia 44, Pa.

New York • Detroit • Pittsburgh • Chicago
Buffalo • Cincinnati • Cleveland • Houston
Washington • Los Angeles • Buenos Aires
Rio de Janeiro • Sao Paulo • Mexico City

Two convection type furnaces (one a duplicate of one erected in 1941) and a direct fired furnace comprise this battery of R-S Car Hearth Furnaces.

Rugged construction throughout and motorized doors and cars operating from central control stations are outstanding features. The entire equipment is geared to individual plant conditions. Economy of operation, low maintenance cost and a minimum of manual effort are assured.

For heat-treating economy, efficiency and long life, specify R-S Industrial Furnaces.

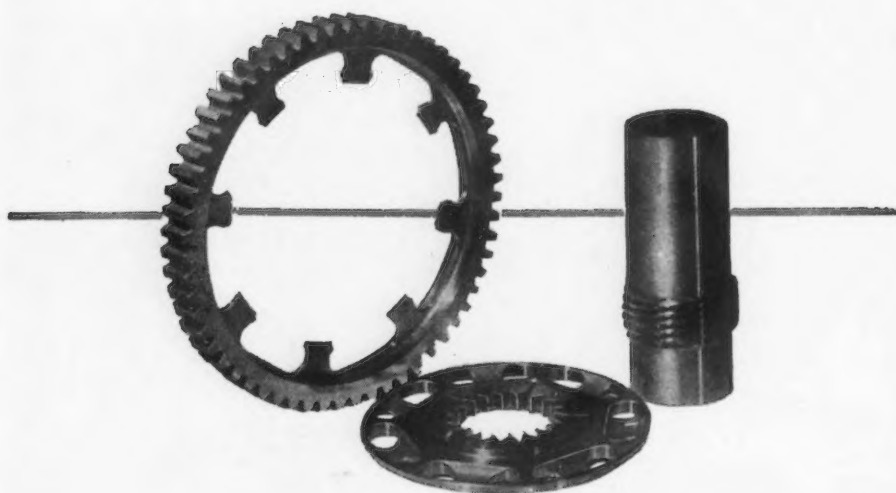
FURNACE DIVISION

R-S PRODUCTS CORPORATION

Manufacturing Engineers

"Furnaces of Distinction"

"Perkins" and "Quality" are synonyms



ALL manufacturers of gears use basic materials—steel—cast iron—bronze—and non-metallic. But it is the skill with which these materials are used that makes Perkins gears *GEARS OF QUALITY*. Custom-cut to your own specifications by our engineers with over 25 years' experience.

If you are in the market for gears of precision, let us hear from you. Our product is conclusive proof that *PERKINS* and *QUALITY* are synonyms.

PERKINS Precision, Custom-Cut GEARS

PERKINS MAKES: Helical Gears, Bevel Gears, Ratchets, Worm Gears, Spiral Gears, Spur Gears, Ground Thread Worms

PERKINS MACHINE & GEAR COMPANY • Springfield 2, Mass.

further participation—particularly on a long term basis. Methods must be found whereby business, itself, will feel justified in taking a fair share of the risk."

Acknowledging that there are "many black spots in our foreign loan record," he pointed out that, from all types of foreign investments during the twenties, investors had accumulated or taken out by 1940 almost \$9 billion more than they had put in and that interest payments received from 1919 to 1940 amounted to approximately 92 pct of our net capital investments abroad.

A sound program of long term foreign investment, the secretary asserted, would provide an outlet for industries with excess capacity built up during the war, would profitably utilize unused capital resources, and contribute to domestic full employment.

Mr. Wallace and other speakers at the conference were unanimous in urging approval of the British loan as a means of breaking down world trade barriers and financial and tariff controls restricting world commerce. The alternative, it was said, was a series of bilateral trade agreements within blocked fiscal areas. Figures were cited indicating that in the event England was unable to repay the loan the cost to American taxpayers over the 50-yr payment period would be \$1.69 per thousand of net income for corporations per year and \$6.90 per ten thousand gross income for individuals per year.

William McChesney Martin, chairman of the Export-Import Bank, said that the bank had authorized nearly \$1 billion of loans in the last six months of 1945 for the war devastated areas of Europe. The loan authorizations made in this half year period amount to approximately 45 pct of the total authorizations made by the bank in the preceding years of its existence.

Reconstruction loans are made by the bank to meet emergency needs, Mr. Martin said, adding, "It is not the intention of the bank to enter into the long term development and reconstruction field which rightfully belong to the World Bank, now in process of organization. It will require some time for the new World Bank to get established, and in the meantime, the areas which the Export-

Exclusive!

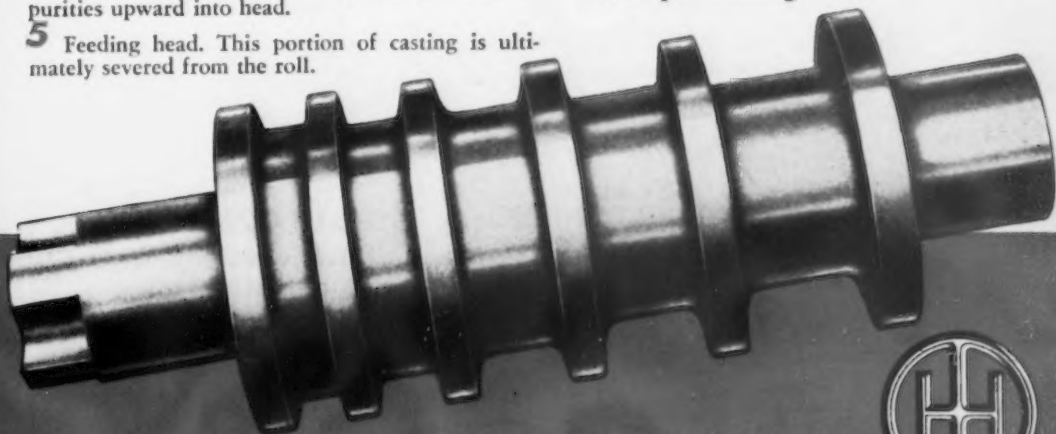
Ohio's QUICK CHILLING PROCESS

WHAT IT IS:

- 1** Cutaway showing chilling progression. Combination of metal chills and running water cools metal at the rate of about 15,000 B.T.U.'s a minute.
- 2** Metal chills which fill passes in roll contour. These help maintain even cooling inward and enable casting to be directionally solidified.
- 3** Patented chill rigging. A network of square pipes carrying approximately 200 gallons of water a minute entirely surround roll. Note that pipes touch chill but do not come in direct contact with roll proper. The water conducts the heat from the chills constantly. Where only metal chills are used, the chilling action decreases as the chills heat up and stops entirely when the chills reach the temperature of the roll surface.
- 4** Metal enters from gate at such an angle as to cause a swirling action which carries dirt and impurities upward into head.
- 5** Feeding head. This portion of casting is ultimately severed from the roll.

AND WHAT IT MEANS:

A ROLL which is cooled rapidly is better for two reasons. First, stimulation of cooling action extends desirable homogeneity of the metal deeper into the interior of the roll. Second, concentrated chilling prevents micro shrinkage within the working section of the roll. This means more resistance to wear—more tons of steel rolled per dressing.



Select from any of these 9 types of Ohio Steel and Iron Rolls: Carbon Steel Rolls, Ohioley Rolls, Ohioley "K" Rolls, HOLL-O-CAST Rolls, Chilled Iron Rolls, Dense Iron Rolls, Nickel Grain Rolls, Nioley Rolls, Flintuff Rolls.



ENGINEERS
FOUNDERS
MACHINISTS

Ohio Rolls

THE OHIO STEEL FOUNDRY COMPANY
LIMA, OHIO • Plants in Lima and Springfield, Ohio

We've been
DEVELOPING
for
YEARS



that
CRANE
you need
TODAY!

Standard Euclid Cranes are available in sizes, types and spans to meet well over 90% of all material handling requirements.

Having been developed through several decades of specialized experience they embody design and construction that assures maximum service life with minimum operation and upkeep expense.

Standardized manufactur-

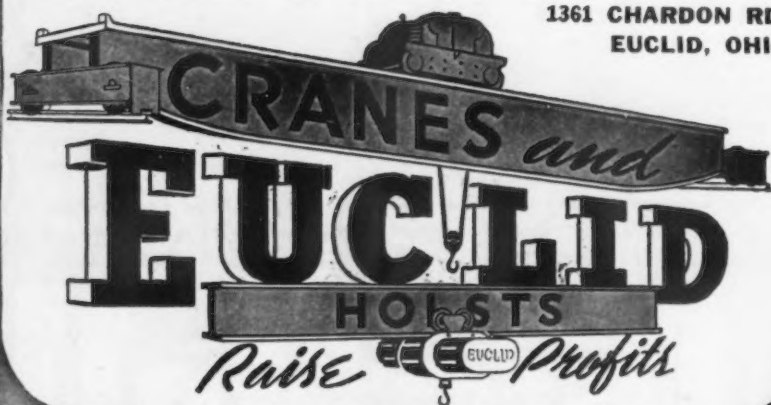
ing assures interchangeability of parts and effects economies that assure the utmost value to purchasers.

Standard Euclid Cranes are available in capacities of 3, 5, 7½, 10, 15, 20 and 25 tons in various spans consistent with their size and power.

It may be definitely to your interest to install a Euclid standard crane. Write for catalog.

THE EUCLID CRANE & HOIST COMPANY

1361 CHARDON RD.
EUCLID, OHIO



NEWS OF INDUSTRY

Import Bank are serving require fuel, raw materials, transportation, power and labor. The last of these is readily available as the equipment for the men to utilize is forthcoming and the economy functioning. It is our hope that our resources will be sufficient to meet all of the emergency needs which business common sense would dictate our needing during 1946."

He stated that the loans were made only after a careful study of ability to repay and that the bank was careful to guide foreign purchases into channels which "not only avoid inflation, but prevent deflation."

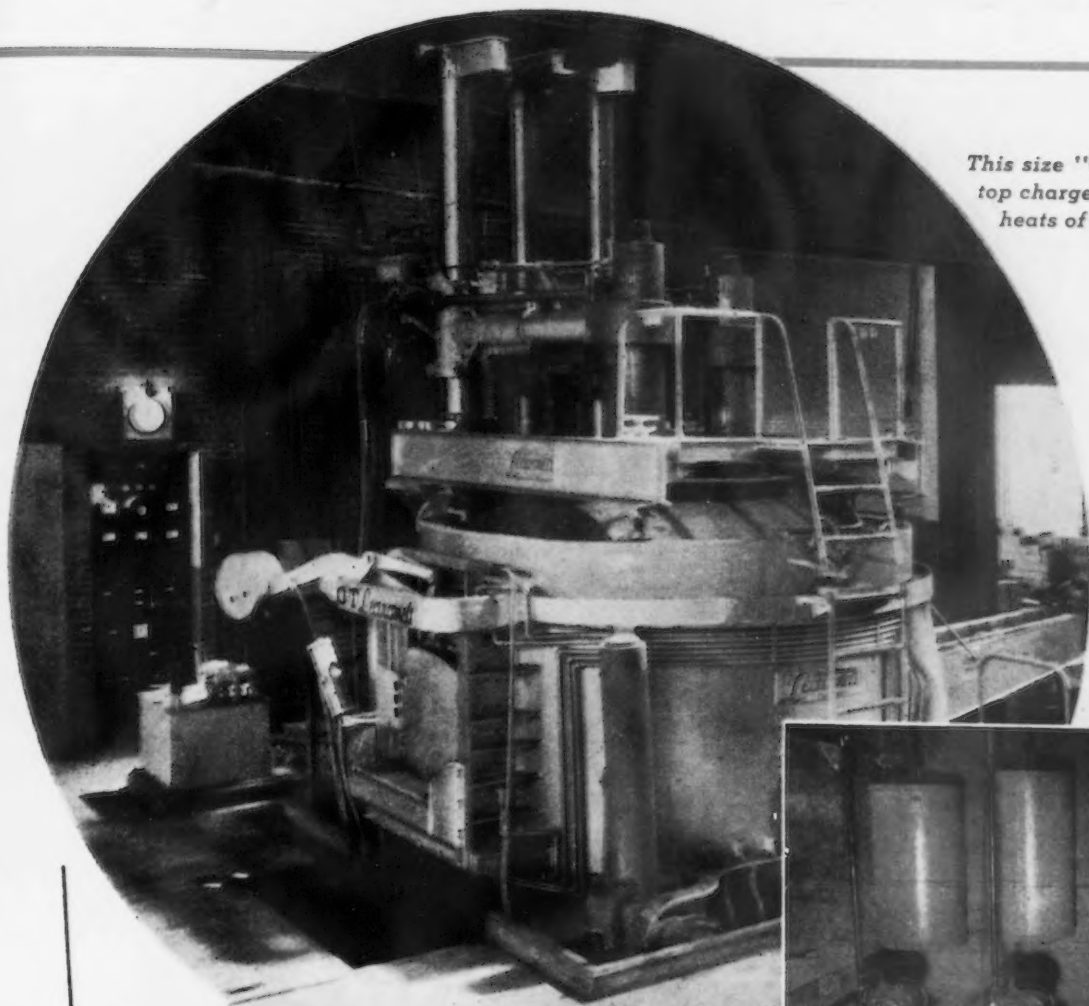
John Abbink, chairman of the National Foreign Trade Council and president of the Business Publishers International Corp., urged that a definite set-aside of American production be agreed upon for overseas shipment.

"The manufacturer who does not help by deciding now to allocate a definite percentage of his output for overseas sale risks expanding political interference in our economy. If we wish to minimize government control we have got to regulate ourselves much more effectively than we have in the past," he said.

"Business is far better able than government to allocate products, whether industry or agriculture. It has every incentive to be fair because its future depends upon satisfied customers, and a comparative few months of all out production freed from inexpert restriction will greatly ease what now seems to be an extremely tight situation.

"Some manufacturers have announced, in the face of considerable opposition from their domestic sales managers and distributors, that they will make available for export the same percentage that prevailed in the 1937-39 period of their now expanded production. That will mean from 8 to 15 pct, depending upon the industry involved. The newcomer to export may well decide to budget on the higher figure, because there is every indication that overseas demands during the next few years will be far beyond anything we have heretofore experienced."

He quoted estimates indicating that to maintain full employment and to assimilate our debt burden



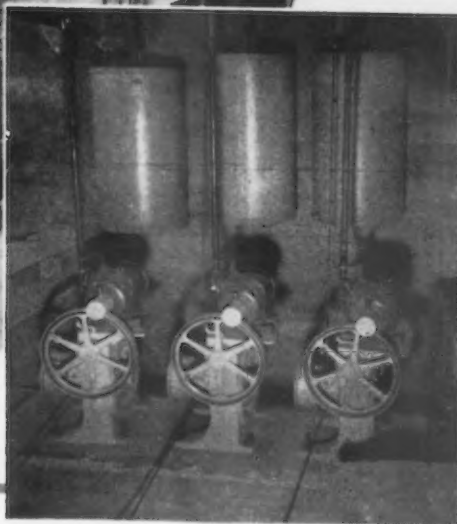
This size "OT" Lectromelt top charge furnace pours heats of 8 to 12 tons.

**MELTING EFFICIENCY
THAT EXCEEDS
ALL OTHER METHODS**

The Lectromelt patented counterbalanced electrode system makes possible furnace efficiency that excels all other metal melting methods.

The entire electrode arm, including electrode, crosshead and holder, is counterbalanced by an over and under friction bite winch system so as to give the most sensitive and rapid electrode movement, thus permitting accurate regulation of the arc and minimizing power consumption and electrode breakage. Full information sent on request.

Lectromelt Top Charge Furnaces available in capacities ranging from 100 tons down to 250 pounds.

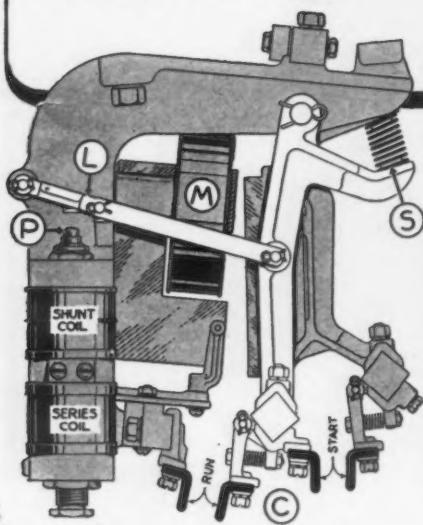


Furnace electrode operating winches.

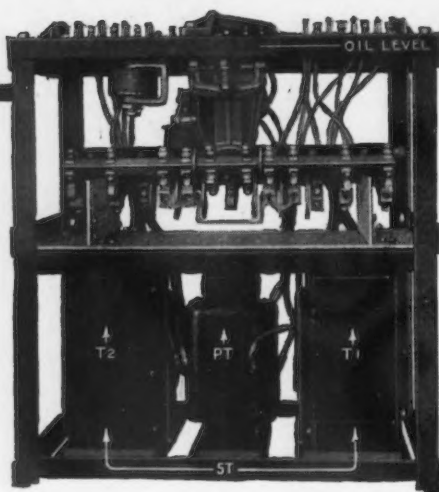
MOORE RAPID
Lectromelt
FURNACES

PITTSBURGH LECTROMELT FURNACE CORPORATION
PITTSBURGH...30...PENNA.

Inherent Interlock between Start and Run Promotes Safety, Reduces Maintenance on This 2300-Volt Motor Starter



Side view of Contactor.



Potential transformer (PT) mounted between auto-transformers (T1 & T2) supplies low voltage for the Push Button circuit.

THIS EC&M automatic Motor Starter for reduced voltage starting of 2300 volt squirrel-cage or synchronous motors uses a simple double-throw contactor (C). The interlock (L), between the starting and running contacts, is inherent in the basic design.

The single operating magnet (M), when energized by the push button, closes the starting contacts, connecting the motor to reduced voltage. When the motor accelerates to the proper speed, a current limit relay raises plunger (P) to trip the mechanical interlock (L). The running contacts then close, connecting the motor across the line. During transition, continuous torque is applied to the motor.



There is no other starter built like this EC&M automatic. Magnetic overload relays of the non-creeping, drop-back type are enclosed above the conduit connection box. Door permitting access to them is arranged for padlock. Meters are optional. Investigate these 2300 volt starters. Bulletin 1047-C, describing them, will be sent promptly on request.

BULLETIN 1047-C STARTER IN STANDARD TYPE II (drip-tight) ENCLOSURE.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79th STREET • CLEVELAND 4, OHIO

it would be necessary to maintain export totals more than twice as high as were reached in any pre-war year, possibly \$10 billion annually on an average.

Arthur R. Upgren, associate editorial editor of the Minneapolis Star-Journal and professor of economics, University of Minnesota, proposed that the United States enter into long term agreements to purchase stabilized amounts of raw material imports. A high and stabilized inflow of imports, he said, was necessary not only to sustain domestic industrial activity at high levels, but to stabilize the world economy. He visualized an agreement over a five to seven year period whereby the raw material producing countries and the United States would carefully plan the volume of imports necessary for high levels of domestic industrial activity.

"We should also be prepared to accept more stable amounts of imports of finished goods in order that the world, now being reconstructed, will know that not only 'our way,' but our market, is the best way and the best market," he said.

Expects Employment Rise

Cleveland

• • • A five pct. employment increase in 1500 major establishments is expected by Mar. 15, bringing the number of workers in the Ohio-Michigan-Kentucky region to a total of 1,611,000, according to figures announced by J. Kimball Johnson, regional director of the U. S. Employment Service.

This would be an increase over the January figure of approximately 75,000 workers. The estimate is based on figures which employers in larger establishments of the three-state region supply to the USES.

"Total employment in identical establishments in January was approximately the same as that reported in December and about 2 pct below the November figure," Mr. Johnson said. "The November figure itself is about 25 pct below that of July, the last month in which such figures fully reflected war employment."

Headquarters FOR SCALES

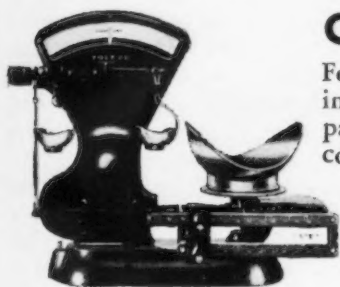
PRINTED WEIGHTS

Toledo Printweigh Scales produce printed weight records in big figures at split-second speed. They eliminate human errors in recording the vitally important weights that so directly affect factory costs and profit. For use with tickets, sheets, or strips. Built in all capacities in which dial scales are regularly supplied. Write for Bulletin No. 032.



COUNTING

For quickly and accurately issuing predetermined quantities of parts or pieces from stock; or counting unknown quantities, as in receiving or inventory. Eliminates slow, tedious hand counts. Wide choice of models ... for extremely small parts, or for parts totalling several



tons in weight. Write for Bulletin No. 204.

BALANCING, TESTING, AND FORCE-MEASURING DEVICES

For balancing connecting rods, propellers ... for testing springs of all kinds, and piston rings ... for continuous check of weight of coated materials in production. Write for further information.

NATION-WIDE SERVICE

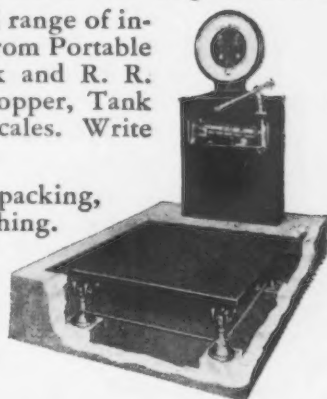
There are 181 Toledo Offices conveniently located throughout United States and Canada. Service mechanics at these offices are factory-trained in the maintenance of all types of scales. Toledo Scale Company, Toledo 12, O.

WEIGHING...in all capacities

Dial Scales For the full range of industrial requirements from Portable Scales to Motor Truck and R. R. Track Scales. Also Hopper, Tank and Overhead Track Scales. Write for Bulletin No. 020.

Over-Under Scales For packing, filling, and check weighing.

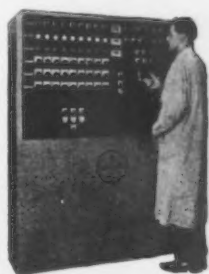
"Speedweigh" for capacities to 5 lb., also bench and portable types for heavier requirements. Write for Bulletin No. 415.



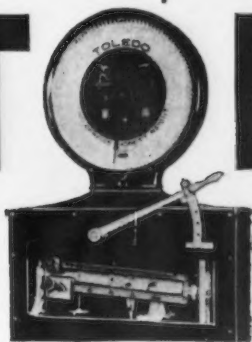
Fan Scales Capacities to 40 lbs. Choice of commodity equipment. Also with metric charts; and for Mail and Parcel Post. Write for Bulletin No. 046.

SPECIAL-PURPOSE SCALES

Toledos equipped with electric cut-off, can be interlocked through control panels for completely automatic batching. Automatic conveyor scales to totalize weights. Airplane weighers; dynamometer scales, etc. Toledo Scale Engineering is available for consultation on special weighing and control problems.



TOLEDO SCALES



ARMSTRONG

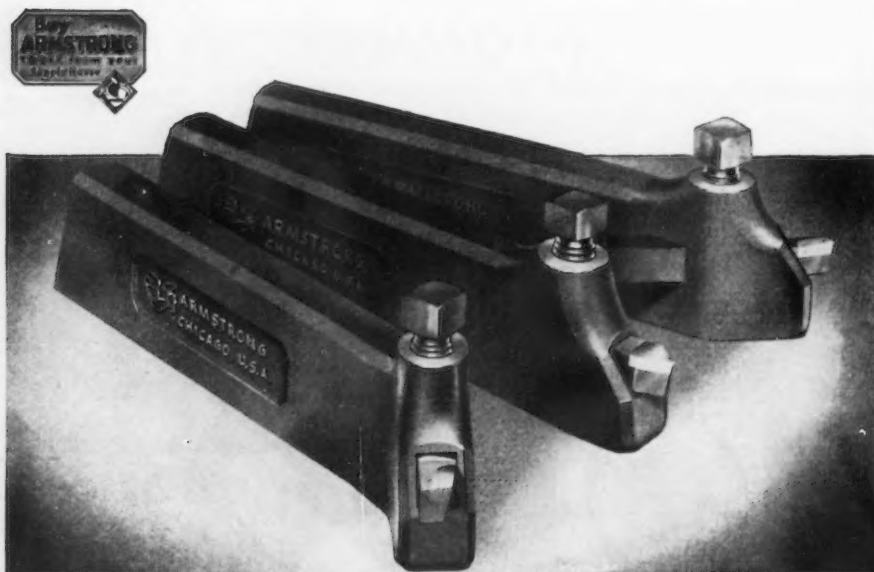


Carbide

TOOL HOLDERS

ARMSTRONG Carbide TOOL HOLDERS have been specially designed and engineered for use with Carbide-tipped tool bits, and embody the special characteristics essential for the efficient use of carbide-tipped cutters, namely: great strength, extreme rigidity and close-up support for the cutting edge. The ARMSTRONG Carbide TOOL HOLDERS System makes the use of carbide tools practical for everyday operations in tool rooms, maintenance departments and machine shops. Each takes interchangeable carbide-tipped tool bits ground to different cutter shapes . . . each tipped cutter can be used in a "Straight Right Hand Off-Set" or "Left Hand Off-Set Tool Holders." Hence a small investment in ARMSTRONG Carbide TOOL HOLDERS and carbide-tipped cutter bits can turn those hard-to-do machining operations into "just another routine job," changing losses into profits.

ARMSTRONG Carbide TOOL HOLDERS and Armide or other carbide-tipped cutter-bits are now available at leading industrial supply houses.



ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

309 N. Francisco Ave.

Chicago 12, U. S. A.

Eastern Warehouse and Sales Office: 199 Lafayette St., New York 12, N. Y.
Pacific Coast Warehouse and Sales Office: 1275 Mission St., San Francisco 3, Calif.

154—THE IRON AGE, March 7, 1946

NEWS OF INDUSTRY

Cleveland to Improve Inland Harbor at A Cost of \$13,236,000

Cleveland

••• To give Cleveland an inland harbor that will be accessible to the larger lake vessels, the largest single program for its improvement, requiring replacement of six railroad bridges and revamping of another over the Cuyahoga River, at a cost of \$13,236,000 has been approved by the War Dept., Herbert P. Ladds, president of the Cleveland Chamber of Commerce has announced.

"After eight years of fruitless effort the navigable channel of the Cuyahoga River is to be generally improved," said Mr. Ladds, "and several times during this period the case of the city had been disapproved by government officials, and the best decision which had heretofore been received had been an 'unconvinced' report.

"The program, pressed to final approval by the Chamber's River and Harbor's Committee, is to be financed by the U. S. Government and the railroad companies concerned. It will be the first major project of its kind under the Truman-Hobbs Bill enacted by Congress five years ago to permit the government to participate in the financing of railroad bridge repairs or replacement when found to be a hindrance to navigation. The Cleveland Harbor program is the first to be recommended by the War Dept. under the new legislation," he pointed out.

Lt. Gen. R. A. Wheeler, Chief of Engineers of the War Dept, in reports to the Committee on Commerce of the U. S. Senate and to the Rivers and Harbors Committee of the House of Representatives, recommends the program and apportionment of expenses involved, to which the railroads had already agreed.

O. A. Reynolds, vice-president in charge of River and Harbor development of the Chamber, outlined the new program as follows:

"Bridges to be removed and replaced by structures conducive to better river traffic conditions include the New York Central bridge at the harbor entrance near Front Ave.; the Baltimore and Ohio bridge at Sycamore St.; two New York Central (C. C. C. & St. L.) bridges at Columbus Road; the

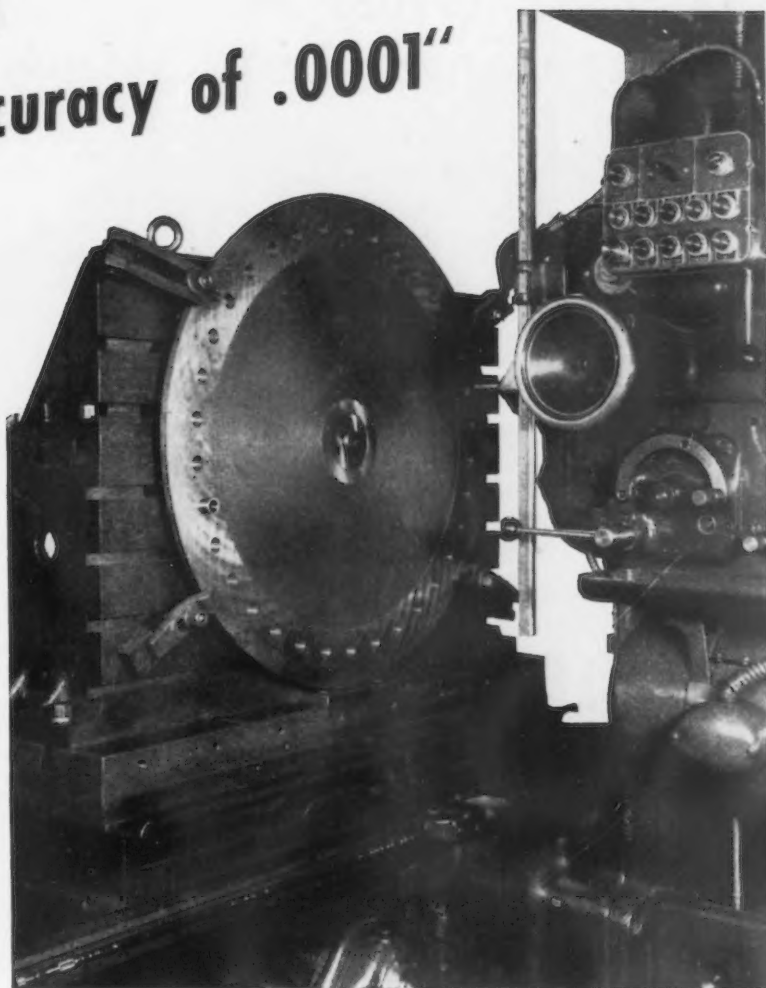
34 Index Holes

Bored to Spacing Accuracy of .0001" in 10½ Hours!

Here's a typical report on the actual results obtained by one manufacturer using the new Model 3-B DeVlieg JIGMIL on a precision boring operation . . .

Part machined was a large index plate . . . 35" in diameter, 1¾" thick . . . of Mehanite casting. Using a Carboboy boring tool, 34, 1¼" index holes were bored to spacing accuracy of .0001" and shoulder depth of 1½" was held to .0002"! Total floor-to-floor time . . . including set-up . . . was 10½ hours!

For such outstanding performance, speed and precision on your own boring operations, investigate the unusual accuracy and high productivity of the Model 3-B DeVlieg JIGMIL today!



The world's finest
Boring and Milling
machine!



Write today for complete
descriptive folder.

**One job well done
deserves another**

Create More Jobs Faster
with a DeVlieg
JIGMIL



Here's why users report two to three times the output with greatly increased accuracy as compared to other methods of boring and milling . . .

Centralized push button controls provide fool-proof precision for all functions of the machine. Automatic positioning of spindle from one location to another is controlled to within less than .0001" . . . and feather-touch, pressure controlled slide locks positively assure dependable locking uniformity after positioning.

DeVLIEG MACHINE COMPANY

**DeVLIEG
JIGMIL**

**450 FAIR AVE. FERNDALE 20,
(Detroit) MICH.**

Dieweld Gives Added Life to Clutch on Rolling Mill Shear

The illustrations show how Amsco Dieweld was effectively employed in building up worn dogs on a rolling mill shear clutch. Picture A-489 illustrates a clutch as worn, and another that has been rebuilt with Dieweld. In Picture A-490, the welder is dressing up the built-up clutch dogs with a portable grinder. The convenient jig for holding the clutch in accessible working position is shown in both pictures.

As Amsco Dieweld offers excellent resistance to shock, and the deposit as welded has a hardness of between 500 and 600 Brinell, it gives a good ac-

The deposited metal has hardness combined with unusual toughness, and the ability to



retain keen cutting edges and resist wear and abrasion in both hot and cold work.

Amsco Dieweld is an alloy containing chromium, molybdenum, silicon and carbon; providing a weld metal which

is air-hardening as deposited, and which may be softened through proper heat treatment for machinability and re-hardened within a desirable range.

Dieweld is one of the group of Amsco welding materials for the reclamation,

hard surfacing and repair of ferrous equipment parts. Details in Bulletin No. 742W on Amsco Dieweld.

(Amsco Welding Products are produced and sold in Canada by Canadian Ramapo Iron Works, Inc., Niagara Falls, Ontario.)



count of itself not only on the clutch dogs—in terms of added service life—but on the knives of the shear as well.

Dieweld has an infinite variety of uses in every maintenance shop, tool room and die shop, where metallic arc, oxy-acetylene or atomic hydrogen welding is done. It finds excellent application in the production and alteration of composite hot and cold forming dies, hot trim dies and punches, shear knives and cutting tools, and for the restoration of such parts when they become worn.

NEWS OF INDUSTRY

New York Central and St. Louis Bridge at University Road, and the Wheeling & Lake Erie bridge at Clark Ave. The project also calls for replacement of the east pier of the Erie Railroad bridge at Mahoning Ave.

"In addition to the railroad bridge program, work is expected to start soon on the removal of the lower Main Ave. highway span by the City of Cleveland. Through the efforts of the Chamber River and Harbor Committee, City Council last summer authorized the removal of this structure after the War Dept. had ruled it a hindrance to navigation.

"The railroad bridge program was instituted several years ago by the Chamber committee. Through the cooperation of Harold H. Burton, then a member of the Senate, and Congressman George H. Bender, enabling legislation was enacted empowering the War Dept. to make a survey of the Cleveland harbor. The War Dept. engaged two private companies as consultants and the survey was completed within a year, resulting in the War Dept's approval of the program.

"We are grateful for the splendid cooperation given all along the line, particularly that extended by the U. S. Engineers at both the district office in Buffalo and the division office in Chicago. We are also appreciative of the work done by the Lake Carriers Assn. through L. C. Sabin, vice-president, and Capt. Carl Rydholm, chairman of the Port Captains Committee, and for the support given the project by Mayor Thomas A. Burke, City Law Director Lee Howley, H. R. Klepinger, chairman of the City's Port and Harbor Commission and Donald B. Gillies, the first chairman of our present River and Harbor Committee. It is a program which could not have been successful had it not been for the aggressive participation of all concerned.

"Much time and effort was put into the project over a period of years, requiring considerable attention by all, including numerous trips to Washington by local delegations embracing representatives of all the groups. The Chamber committee, headed by C. F. Hood, president, American Steel & Wire Co., with Harry Hobart, vice-president, Great Lakes Towing

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TYPE "A" ASSEMBLY BIT



The Clutch Head Pay-Off in Performance

and lower cost is definite. Using this exclusive Lock-On feature for precision assembly of their "Adjust-A-Cone" Units, QUAM-NICHOLS CO., CHICAGO, record a 20% increase in assembly operation as well as the solution of two important problems. Damage from driver slippage went to zero and the simplicity of common screwdriver operation disposed of field service handicaps.

THIS LOCK-ON, available only with CLUTCH HEAD, is effected with a simple reverse turn of the Type "A" Bit in the head recess. This unites screw and bit as a unit for speedy, easy one-handed reaching to hard-to-get-at spots.

IN "UN-BUTTONING" THE JOB TOO, the reverse action automatically forms the Lock-On. Thus the Type "A" Hand Driver for field service withdraws the screw undamaged and safely held against dropping or loss for re-use. In many cases, this automatic Lock-On saves the dis-assembling of surrounding units.

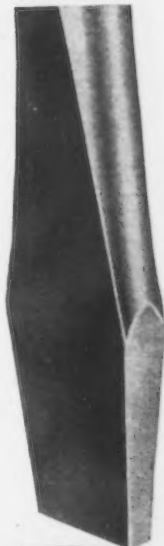
You may personally test this feature, and the many other exclusive CLUTCH HEAD advantages for faster, safer, smoother, and lower cost production. Ask us to mail you package assortment of CLUTCH HEAD Screws, sample Type "A" Bit, and illustrated Brochure.

This rugged Type "A" Bit is important to tool economy. It delivers longer uninterrupted service and its original efficiency may be repeatedly restored by a 60-second application of the end surface to a grinding wheel.



Check the perfect operation of this screw with an ordinary type screwdriver or any flat blade, reasonably accurate in width. This is an exclusive feature that contributes importantly to emergency service in the field.

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UNITED SCREW AND BOLT CORPORATION

CLEVELAND 2

CHICAGO 8

NEW YORK 7

An idea on competition in **COSTS**

PERHAPS you have a new product . . . and are working to get its cost down to meet competition.

In the fitting of machine parts, Laminum shims are saving important hours. You simply peel your precision from the solid shim . . . with certainty of accuracy because of the uniform gauge of its laminations. Bulletin on request.

Laminum shims are cut to your specifications. For maintenance work, however, shim materials are sold through industrial distributors.

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LAMINUM

THE SOLID SHIM THAT *peels* FOR ADJUSTMENT

2220

158—THE IRON AGE, March 7, 1946

Co., as vice chairman, displayed great perseverance in keeping the project alive over such a long period of time, and in pushing it through to final success."

Mr. Reynolds pointed out that greater strides have been made in the improvement of Cleveland's inland harbor during the last nine years than had been accomplished in almost a century previous. Approximately \$10,000,000 has been expended on improvement of the river by building new highway bridges, straightening of bends and in new bulkheading during the past several years. In addition to approving the railroad bridge program, the War Dept. also has recommended deepening the channel of the Cuyahoga River to 23 ft and an additional \$35,000 annually for maintenance work. This additional allotment of funds will make available approximately \$200,000 yearly for maintenance work, Mr. Reynolds said.

Reports Drop in 1945 Net Profits, Sales

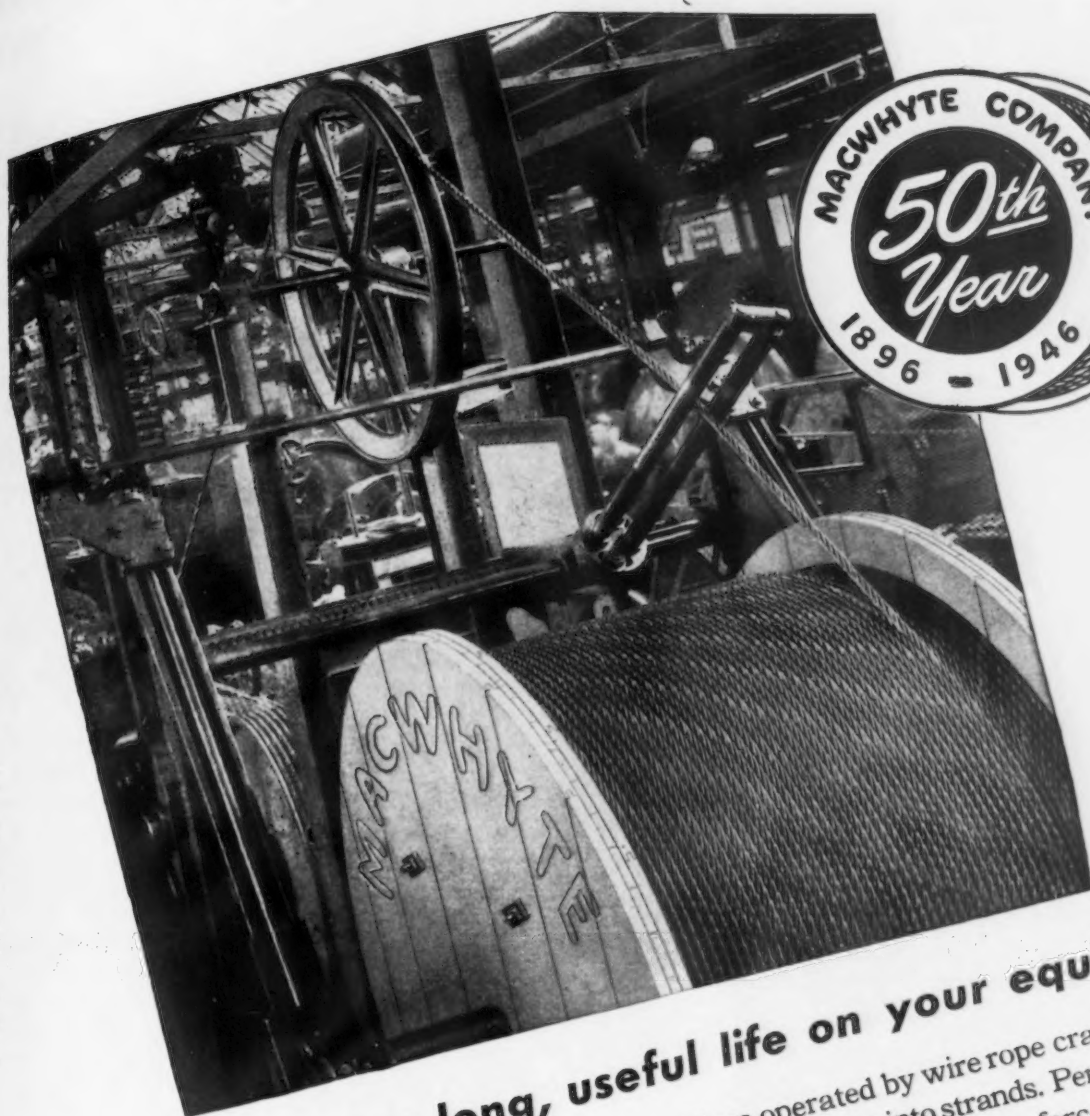
Chicago

• • • In the annual report to stockholders for the fiscal year ended Oct. 31, 1945, Foote Bros. Gear and Machine Corp. reports net income of \$703,781 after all charges including a reserve of \$865,000 against possible refund of profits through renegotiation of war profits. This compares with net income for the previous fiscal year of \$1,034,534.

Renegotiation of profits for the 1944 fiscal year has been completed. Reserves for that purpose substantially covered refund of profits for that year, according to W. A. Barr, president of the company.

Net sales for the last fiscal year amounted to \$33,306,050 compared with \$45,683,391 for the previous year. Substantially all war contracts with the government have been cancelled, Mr. Barr stated, and the company is now working almost wholly on orders from peacetime sources. Unfilled orders on the books at the year-end amounted to a substantial total and during the intervening months has increased substantially.

As of Oct. 31, 1945, the net working capital amounted to \$3,382,461, an increase of \$955,179 over the total at the end of 1944.



Ready to start a long, useful life on your equipment

Here you see Macwhyte Wire Rope as it comes from the closing machine. It is now ready to start giving the long service that has been so carefully built into it.

Select quality steel rods were its beginning. They were scientifically heat-treated and cold-drawn, into tough, metallurgically uniform wire. Precision

machines operated by wire rope craftsmen layed the wire into strands. Permanent internal lubrication was force-fed around each wire. Closing the lubricated strands completed the wire rope that will give longer, more economical performance on your equipment. Macwhyte distributors and factory representatives are at your service.

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Steel Wire Rope, Monel Metal Wire Rope,
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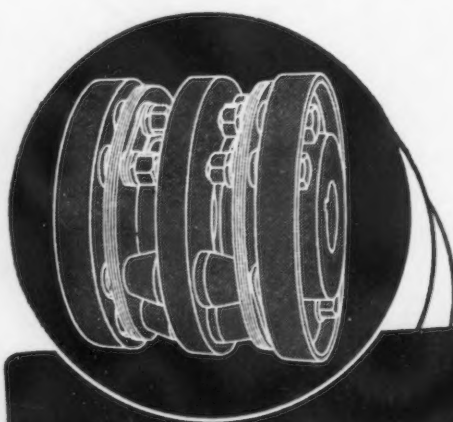
170-page Wire Rope Catalog G-15,
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representative or write Macwhyte Company.

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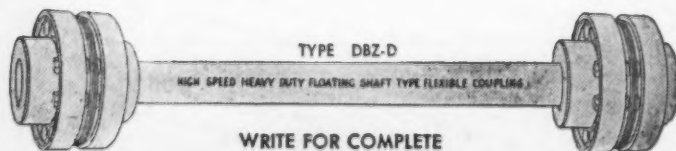
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Misalignment as well
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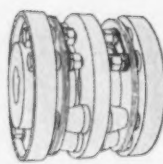
and Eliminate
**BACKLASH, FRICTION,
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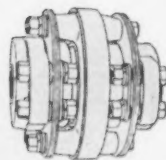
The Thomas All-Metal Coupling
does not depend on springs, gears,
rubber or grids to drive. All power
is transmitted by direct pull.



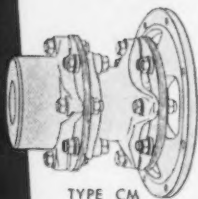
WRITE FOR COMPLETE
ENGINEERING CATALOG



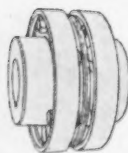
TYPE DBZ



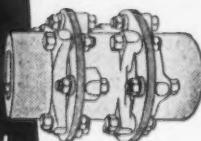
TYPE DSM



TYPE CM



TYPE ST



TYPE AM



TYPE SS

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

NEWS OF INDUSTRY

Research Staff of CED Proposes Extension Of Price Controls to 1947

New York

... The research staff of the Committee for Economic Development present a program of fiscal, monetary and price control policies in "Jobs and Markets" to speed the expansion of civilian production and employment; to prevent inflation and depression in the return to free markets, and to remove the need for price control at the earliest possible time. Key recommendations of the report follow:

(1) Price control authority should be extended to June 30, 1947, but not beyond (except for rents).

(2) While it lasts, price control must be streamlined and liberalized. The OPA must follow a course of calculated risk in suspending controls. Price ceilings must be adjusted if they seriously deter or distort production. Pricing standards should permit the average profit expectations of normal prosperity. The present earnings standard for price relief—the 1936-39 average return on net worth, before taxes—should be raised by about one third. Increases should also be permitted whenever the price of a product fails to cover average total costs of production and not, as at present, average direct costs only. All price adjustments under these standards should be based on actual cost experience of the most recent quarter of normal operations, without distinction between approved and unapproved wage increases.

(3) The period before the end of price control (June 30, 1947) should be employed to strengthen the instruments of monetary and fiscal policy. Once the present excess of demand has done its necessary work of speeding reemployment, monetary and fiscal measures should be used to curb the excess or prevent demand from becoming deficient, as may be needed.

(4) The Congress and the Administration should plan to balance the federal budget at existing tax rates in fiscal year 1946-47 and if possible run a budget surplus. The government should be pre-

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NEWS OF INDUSTRY

pared to generate a substantial budget surplus if inflationary pressure continues strong at high employment levels.

(5) To prepare for a possible reversal in which demand-supporting measures would be needed, a large shelf of public works which could be quickly started should be made ready.

(6) In view of the uncertainties of the transition, the speed with which fiscal policy can be brought to bear upon an excess or deficiency of demand should be increased. When tax revisions are considered, priority should be given to measures which add "built-in flexibility"—the capacity of the tax system to yield higher revenues when incomes increase and lower revenues when incomes decrease. This can be done by placing relatively more reliance on pay-as-you-go income taxes and relatively less on excises, by permitting the averaging of income in tax computations and by speeding up the payment of tax refunds.

(7) Congress should authorize temporary (three or six month) variations from the permanent tax rate on the first bracket of the personal income tax and the Bureau of Internal Revenue should prepare the necessary regulations and forms. The change of rate should be enacted by Congress when it finds the change necessary to avoid inflation or prevent unemployment. This would be a powerful instrument to restrict or stimulate consumers' spending but would not unsettle those taxes that chiefly affect business decisions.

(8) Congress should authorize the Board of Governors of the Federal Reserve System to raise reserve requirements substantially above present limits and to count Government securities held by banks as reserves. This will enable the Federal Reserve to prevent the banks from obtaining additional reserves by selling government securities to the Federal Reserve Banks and using the reserves thus acquired to expand bank assets and deposits.

(9) The Federal Reserve should not prevent government bonds from falling slightly below par if a tendency develops for the public to sell bonds in order to buy stocks, real estate, other investments or consumption goods. Under present policy, to prevent a

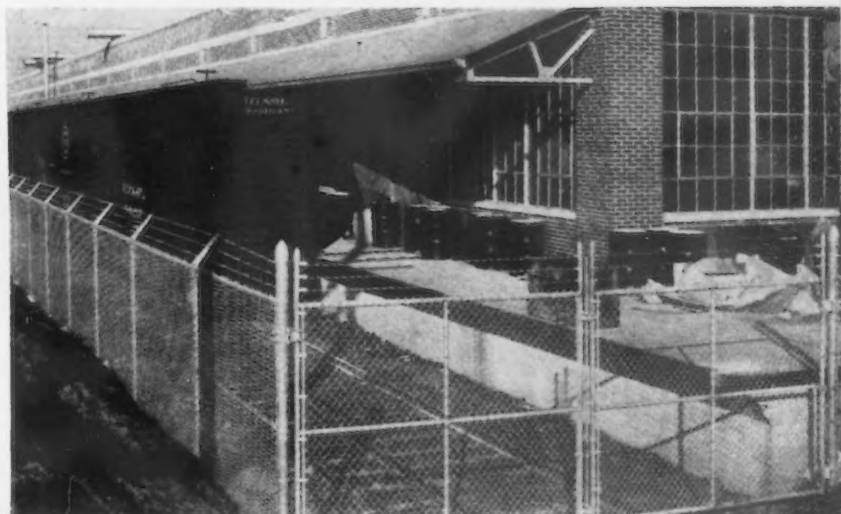
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Continental fence has 14 distinctive construction features including heavier line posts . . . stronger and more easily operated gates . . . improved pivot-type hinges . . . self-locking barb arms . . . and 20% more ties . . . fabric of rust-resistant, full gauge wire of KONIK steel with heavy uniform zinc coating.

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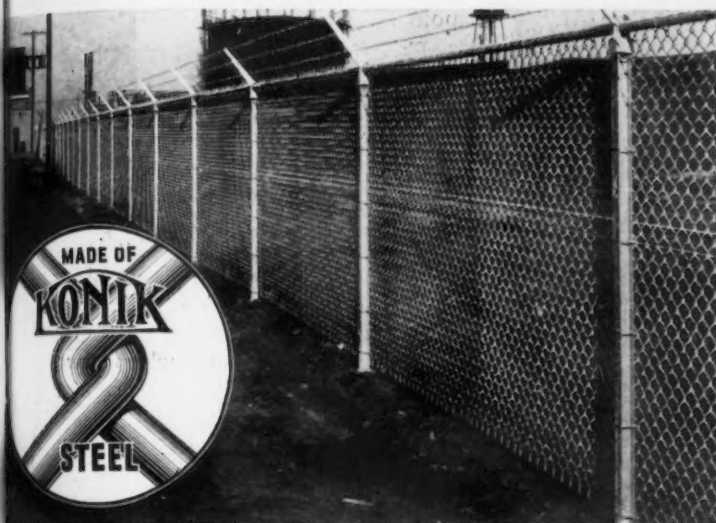
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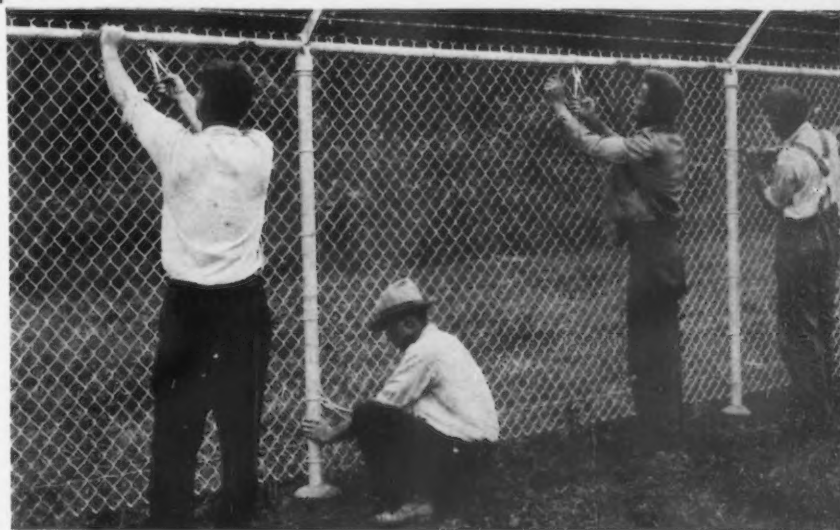
All this greater strength and rust-resistance . . . all this "clear through" quality . . . all the extra values of this modern steel now come to you only in Continental Chain Link Fence . . . and you get them at no added cost. No other fence gives you KONIK steel for longer fence life.



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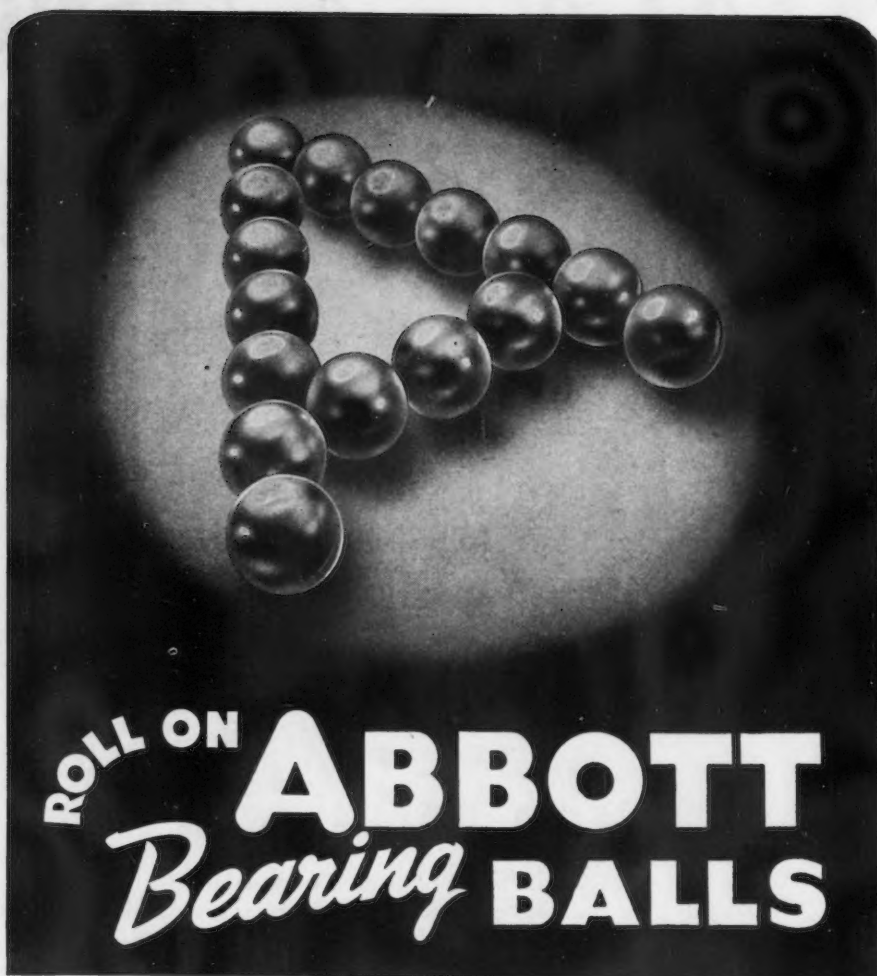
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drop in bond prices the Federal Reserve would buy bonds, thus increasing the public's holdings of cash (bank deposits) and banks' holdings of reserves. Thus the money supply would be increased just when a decrease would be needed to protect against inflation.

(10) Executive responsibility for transition policy should be clearly lodged in a central authority. This authority should be charged with developing and directing a unified program of fiscal, monetary and price control action to maintain price stability and high employment in the transition. Congressional committee procedure should be consolidated to permit prompt consideration of transition policy from an over-all viewpoint.

The report emphasizes the importance of labor-management co-operative efforts to increase productivity during the transition and the need for raising the average level of real wages as productivity permits. If potential gains in productivity are realized, if business taxes can be and are reduced to prewar levels and if a high level of employment is achieved, real wages one fourth to perhaps two fifths above 1939 would be not only possible by 1948 but necessary to provide markets for post-war output.

Produces Gear Picture

New York

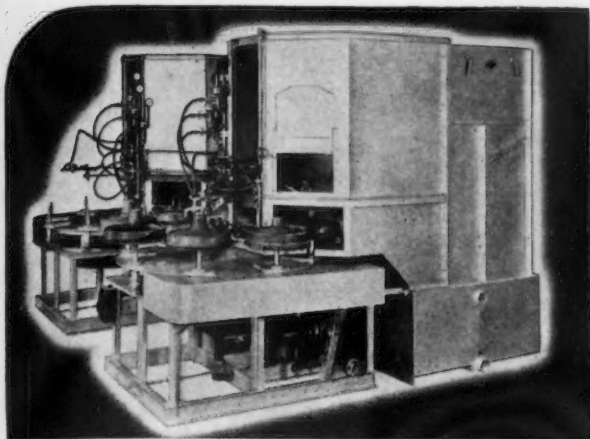
•••Produced in sound and full color, a new motion picture, "The Art of Generating and Gear Manufacturing Equipment" has been announced by the Fellows Gear Shaper Co., Springfield, Vt.

The film is in two reels, the first covering gear theory, gear design and gear action, and applications of the generating principle, while the second reel includes gear cutting and finishing equipment, and gear measuring and testing equipment. The entire subject is treated skillfully, and with considerable attention to detail so as to give the audience a maximum of technical information.

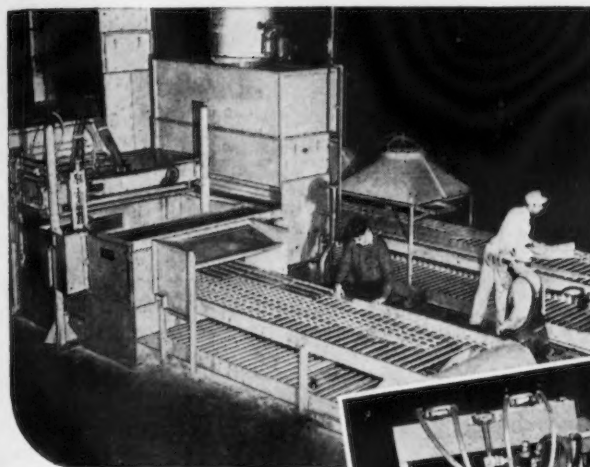
Either or both reels may be obtained free of charge from the Fellows Co. for private showings, or may be purchased at actual print cost. Running time for the first reel is 15½ min, and for the second reel 29 min.

THEY

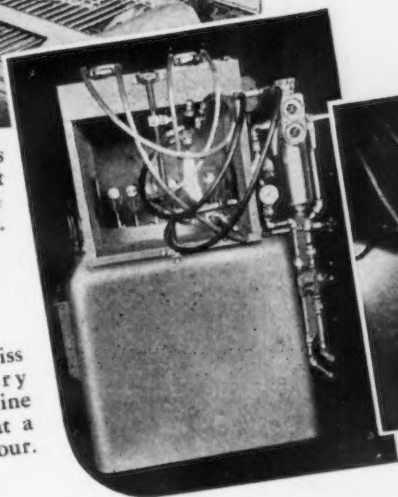
Knocked the Bottom Out OF FINISHING COSTS



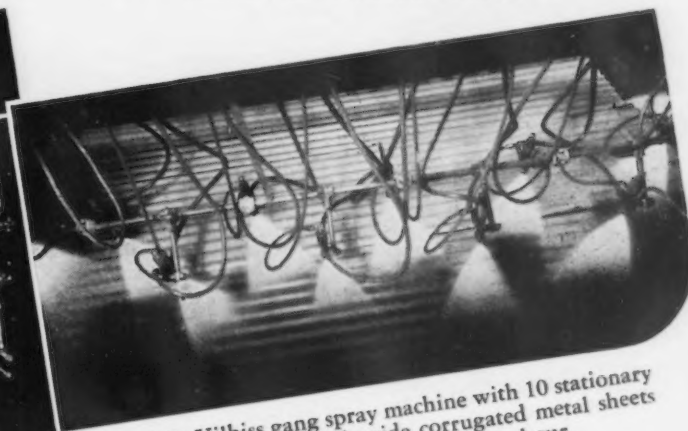
A DeVilbiss heavy duty rotary machine paints 1500 automobile brake drums an hour. Two machines saved their cost in 9 months.



A horizontal transverse DeVilbiss Automatic paints small aircraft structural parts in less than 15% of the manual spraying time.



A light duty DeVilbiss Automatic Rotary Spray Coating Machine paints golf balls at a rate of 3600 per hour.



A DeVilbiss gang spray machine with 10 stationary guns paints 148-inch-wide corrugated metal sheets—spraying 120 gallons an hour.

● The amazing speed of DeVilbiss Automatic Spraying has slashed finishing costs for many manufacturers. And now, with production costs climbing, the substantial savings from this modern finishing method are more timely than ever.

Look at the versatility of DeVilbiss Automatic Machines—from tinting 1200 lamp shades an hour to painting 200 feet of pipe a minute. They are made in widely diversified types including light and heavy duty rotaries, chain-on-edge, horizontal and vertical transverse, gang spray and others. And each is a complete finishing system.

See if your finishing and coating can be done automatically. Ask the pioneer and leader of automatic spraying—DeVilbiss. Our representative near you will gladly check to see if you can share in the profitable advantages of DeVilbiss Automatic Spraying.

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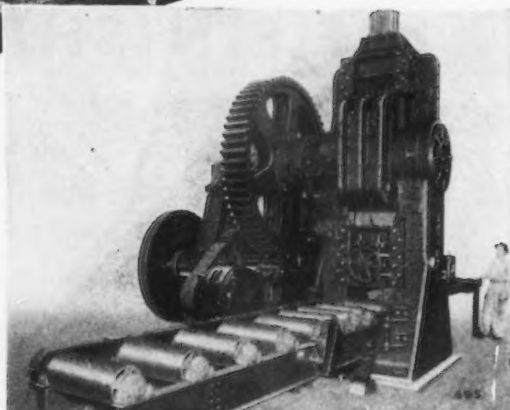
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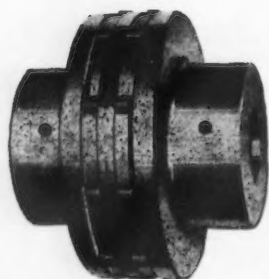
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CHICAGO 44, ILLINOIS

Foundry Cost Saving Techniques Discussed

Pittsburgh

• • • Leading a forum type discussion on foundries and foundry practices with the question, "On the assumption price increases will not cover wage increases, where can the foundry industry turn to recover these losses?", the Pittsburgh Foundrymen's Assn., on Feb. 18, delved into money saving methods in foundry practice. The discussion took dual channels, covering independent jobbing foundries and those that are part of bigger organizations, the captive foundries.

Hugo Hautman, of Westinghouse Airbrake Co., Wilmerding, Pa., pointed out that independent and captive foundries alike would have to look into the plants and improve, modernize, and mechanize both production and preparatory lines, especially in shops where long production runs are handled. The small job shops, he said, are headed for real trouble in the present wage inflationary period.

A. M. Cadman, of the A. W. Cadman Mfg. Co., Pittsburgh, a nonferrous foundry, indicated the belief that captive foundries can't help the situation as a whole very much because they are not directly involved with OPA on pricing. The jobbing foundries are involved directly, and their salvation is to cut corners and do the best job possible until a change in government policy evolves.

O. Nadolny, of Duquesne Pattern & Bronze Co., McDonald, Pa., stated that the mortality of small jobbing foundries throughout the country has been very high because of government price policies and pointed to the fact that many foundries, especially in the Connecticut area and in Cleveland and Chicago, have had to close up.

A. B. Dick, Westinghouse Electric Corp., stated that Westinghouse is rapidly changing its techniques of motor fabrication away from the foundry. Molds are now being made for making motor brackets by die casting rather than conventional methods, and many designs in motors are being changed from cast to fabricated construction. Also, he pointed to the fact that it is extremely difficult to purchase machine tools for the simple reason that the manu-

facturers cannot get the necessary castings.

William J. Laird, chairman of the association's nonferrous committee, claimed that in nonferrous foundry practice, especially brass and bronze foundries, scrap losses were extremely high. In charge of the Westinghouse Electric Corp.'s nonferrous foundries, Mr. Laird said that generally, melting in nonferrous shops is a sloppy business and the losses that could be recovered by closer control of melting practice could do a lot toward paying for the inevitable increases in labor costs.

Getting into foundry practices, a panel of technical committee chairman and members, headed by M. J. Kellner, vice-president of the association, answered the group's questions on foundry practice. How to obtain a good clean cupola drop in gray iron practice; how to prevent sand sticking to patterns and core boxes; the merits of open flame, electric arc and induction, and crucible melting in nonferrous practice; and the best methods of deoxidizing acid electric furnace steel were among the topics discussed.

Workers Set Plant Record

Middletown, Ohio

• • • A new production record in the openhearth department of American Rolling Mill Co.'s plant here was established during January when workers produced 800 tons more steel ingots than in any similar period in the plant's history. New production records were also set in the plant's cold strip per rolling and shearing units.

Halts Unauthorized Strike

Chicago

• • • The recent unauthorized strike of masons at the Gary works of Carnegie-Illinois Steel Corp., which finally involved about 500 employees including some production workers, ended Saturday when the United Steel Workers Union put its foot down and insisted that the men return to work. The strikers had protested the suspension by the company of foremen who had joined the general steel strike.

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Troxide Bright-Dip Formulae eliminate the hazards commonly present in the conventional bright-dip formula. No "splash-burns" from accidental splashing . . . no dangerous, corrosive fumes. In addition, Troxide Formulae will give you the degree of brilliance your metal-finishing job requires.

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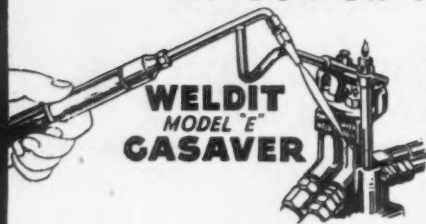
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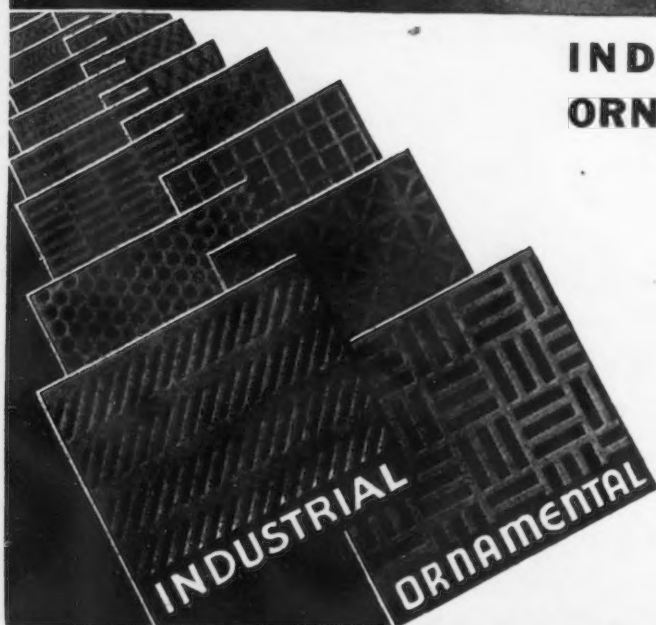
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NEWS OF INDUSTRY

RFC Consumer Surplus Goods Outlets Named

New York

• • • The Consumer Goods Div. of the Reconstruction Finance Corp. has adopted a new policy in setting up surplus material for sale in its magazine *Surplus Reporter*.

Consumer goods is listed on a national basis bringing together available property of like classification under one heading and in one section.

Goods from the hardware, general products, plumbing, heating, air conditioning, and electric sections are presented in separate divisions, in a recent issue of the RFC paper. Conditions of sale, methods of buying, general information and location of regional offices through which purchases may be made are indicated.

The regional offices and the districts which they serve are shown as follows: Region 1. Connecticut, Maine, Massachusetts, New Hampshire, Vermont and Rhode Island—600 Washington St., Boston 11, Phone: Lafayette 7500. Region 2. New York and New Jersey—Empire State Bldg., 61st Floor, New York 1, Phone: Murray Hill 3-6800. Region 3. District of Columbia, Delaware, Pennsylvania, Maryland and Virginia—Lafayette Bldg., Fifth and Chestnut Sts., Philadelphia, Phone: Walnut 4400. Region 4. Indiana, Kentucky, Ohio and West Virginia—704 Race St., Cincinnati 2, Phone: Parkway 7160. Region 5. Illinois, Michigan, North Dakota, South Dakota, Minnesota and Wisconsin—209 S. LaSalle St., Chicago 4, Phone: Franklin 9430. Region 6. Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina and Tennessee—105 Pryor St. NE, Atlanta 3, Phone: Walnut 1301. Region 7. Louisiana, Texas, Arkansas and Oklahoma—P. O. Box 1407, Fort Worth 1, Tex., Phone: 2-1287. Region 8. Iowa, Kansas, Missouri and Nebraska—2605 Walnut St., Kansas City 8, Phone: Harrison 0375. Region 9. New Mexico, Utah, Colorado and Wyoming—728 15th St., Denver 2, Phone: Keystone 4151. Region 10. California, Arizona and Nevada—30 Van Ness Ave., San Francisco 2, Phone: Underhill 1922. Region 11. Oregon, Montana, Idaho and

Washington — 2005 Fifth Ave.,
Seattle, Phone: Maine 2782.

In process of being staffed to handle consumer goods sales are offices in the following cities: Birmingham, Charlotte, Cleveland, Dallas, Detroit, Helena, Houston, Jacksonville, Little Rock, Los Angeles, Louisville, Minneapolis, Nashville, New Orleans, Oklahoma City, Omaha, Portland, Richmond, St. Louis, Salt Lake City, San Antonio and Spokane.

Report Shows Gains In Plant Employment

Chicago

••• Illinois steel plants made little progress in their drive to gain more workers during November 1945, but nonferrous metal plants and agricultural implement makers showed sharp gains, figures released recently by the Illinois Dept. of Labor indicate.

The employment index rose 1.6 points from Oct. 15 on blast furnaces and rolling mills, but foundry and forge products dropped 0.7 pct to 120.4. The 1935-39 period equals 100 in the index.

Sharp gains were shown by agricultural implement plants whose employment index rose 10.8 pct to 112.4 and by nonferrous metals and products, where employment jumped 13.1 to 138.3. Machinery and machine tools rose 1.5 pct to 160.2, and electrical machinery and apparatus rose 6.6 pct to 161.1. The index for the entire metals and machinery group gained 4.4 to 130.6.

The average hours of work was 52.3 for blast furnaces and rolling mills; 43.6 for foundry and forge products; 43.5 for nonferrous metal products; 39.9 for agricultural implements; 44.9 for machinery and machine tools; 43.5 for electrical machinery and apparatus; and 43.1 for the entire metals and machinery group.

Average hourly earnings were \$1.16 for blast furnaces and rolling mills; \$1.14 for foundry and forge products; \$1.03 for nonferrous metals and products; \$1.14 for agricultural implements; \$1.12 for machinery and machine tools; \$1.11 for electrical machinery and apparatus; and \$1.10 for the entire metals and machinery group.

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- () Free Manual of Welding and Fabricating Procedures for IngAclad

Production of Iron And Steel in Canada Drops Slightly in '44

Toronto

• • • Reports from Canadian manufacturers of iron and steel and their products indicate a gross production valued at \$2,560,240,000 at factory prices for the year 1944, according to a preliminary analysis by the Dominion Bureau of Statistics. This output value was only 0.6 pct below the corresponding figure for 1943. At the end of the year there were 2154 plants in Canada engaged in the manufacture of iron and steel and their products, compared with 2044 in 1943. The average number of employees in these industries was 416,926 against 435,744 in 1943. The plants were distributed by provinces as follows, for 1944: Prince Edward Island, 7; Nova Scotia, 77; New Brunswick, 37; Quebec, 458; Ontario, 1160; Manitoba, 90; Saskatchewan, 34; Alberta, 63; British Columbia and Yukon, 228.

During the year 1944 there were 64 plants in Canada engaged in the production of pig iron, ferro-alloys, steel and rolled products

and the gross selling value of their output was \$212,509,681. Iron castings were produced by 200 plants, with a total value of \$74,604,055; heating and cooking apparatus, 71 plants, with value of product \$27,496,969; boiler tank and plate works, 37 plants, value of products, \$32,476,377; farm implements, 40 plants, value of products \$61,108,706; machinery, 261 plants, value of products \$143,851,773; automobiles, 5 plants, with value of output \$324,090,755; automobile parts, 105 plants with value of output \$161,389,038; bicycles, 8 plants, with value of output \$2,964,189; aircraft, 44 plants, value of output \$423,844,296; shipbuilding, 94 plants, value of production \$338,311,664; railway rolling stock and parts, 37 plants, value of production \$167,381,991; wire and wire goods, 83 plants, value of production \$41,162,243; sheet metal products, 196 plants, value of output \$107,571,230; hardware, cutlery and tools, 248 plants, value of production, \$84,877,779; bridge and structural steel, 22 plants, value of production \$61,625,234; machine shops, 473 plants, value of production, \$27,574,848; miscellaneous iron and steel, 166 plants, value of production \$267,399,172.

Continental Steel Net Income Leveling Off

Kokomo, Ind.

• • • Earnings of Continental Steel Corp. for 1945 after all known charges, amounted to \$612,542.98, compared to \$508,660.73 for 1944, the corporation's annual report shows.

Caught between rising raw material costs and fixed price ceilings, earnings showed a continued downward trend during the last half year, according to D. A. Williams, president. Cost of an 18½ cent per hr wage increase would be \$1,337,465 to the firm, Mr. Williams stated.

"Late in the year the mill [Farrell works] from which we purchased sheet bar for our Canton plant was sold and it seemed doubtful that we could operate that plant beyond the end of the year. However, it now seems that we will be able to obtain bar from that source for at least another three to four months. Whether or not it will be

necessary for us to close that particular operation remains to be seen," Mr. Williams declared.

Continental's net sales for 1945 were \$23,564,277.20 compared with \$22,474,066.39 for 1944.

A proposal will be placed before the annual stockholders meeting Mar. 19 to authorize one million shares of common stock with a par value of \$14 per share, to be exchanged on the ratio of 2½ to 1 for each of the present non-par shares. State capitalization would be increased from \$5,279,300.02 to \$7,022,680.

AISE Meets May 6-7

Pittsburgh

• • • The 1946 annual spring conference of the Assn. of Iron and Steel Engineers will be held under the auspices of the association's rolling mill committee at the Congress Hotel, Chicago, May 6 and 7. In addition to rolling mill topics, the program includes one session on heating for rolling, and another on rolling mill bearings.



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Reports Vets Applying For Building Training

Cleveland

••• A growing number of veterans returning to the Ohio-Michigan-Kentucky region are applying for apprentice training in bench, metal and construction trades, according to J. Kimball Johnson, regional director of the U. S. Employment Service.

Mr. Johnson and John R. Newland, regional supervisor of apprentice training for the U. S. Dept. of Labor, estimate that the three-state region could absorb a minimum of 100,000 apprentices in 150 different trades.

"The majority of veterans," said Mr. Johnson, "are applying for training in inside and service trades in addition to the building and other trades. A large number of them realize the opportunities offered in the building trades, which reports indicate will experience greatly expanded activity during the next five to 10 yr."

The apprentice training service has completed a national study of the postwar need for apprentices, which shows that 105,700 apprentices must be graduated annually to assure a force of 5,284,000 skilled workers for industry. The study also shows that not less than 222,000 additional apprentices must be employed each year with a total of 395,000 men in training at all times.

Recently, Warner & Swasey Co. resumed training apprentice machinists. Before the war, the company trained 60 to 85 men at a time, in a four-year course. Warner & Swasey has been training machinists for more than 60 years.

Reduces Tinplate Exports

Washington

••• Because of pressing domestic requirements, particularly for containers for perishable and seasonal goods, CPA has reduced the export allotment of tin plate for the first six months of 1946. The original quota which is said to have been approximately 215,000 tons has been cut to approximately 150,000 tons, which with a carry-over of 30,000 tons from last year will, under the present plan, mean exports of about 180,000 tons for the first half of the current year.

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Supercharging Diesel engines	Insulation blowing
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Manufacturing explosives	Transporting live fish

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Swiss Federal Railway 10-yr Works Program To Cost \$176½ Million

By JACK R. HIGHT

London

• • • Swiss Federal Railways have underway a 10-yr new works program to cost a total of 760 million Swiss francs (approximately \$176,500,000) which is to include the expenditure of 90 millions of francs (\$20,900,000) for new rolling stock in an immediate program. According to a report issued by the British Railway Research Program Service an installation of double tracks at a cost of 246 million francs (\$57,142,000), and an electrification program to cost an ultimate 51 million francs (\$11,846,000) is also to be included.

The railway program is a part of a larger overall Swiss public works program that is to cost a total of 6000 million francs over the 10 yr, 1944-1954, and is designed to aid in the country's post-war employment problems, as well as in the development of the transportation system. According to information from the railways, the program is made up of improvements long studied by the transport organizations and has none of the aspects of a "made work" program common to public works schemes.

Considerable attention has been paid in the planning stages (most of which were completed last year) to the preparation of a program of such a flexible nature that the unknowns of the post-war period might be properly taken into account, and the system adjusted to changing political, economic and railway conditions. Among the considerations involved in its preparation as a part of a nationwide employment program were the relative urgency of any part of the program both from the railway point of view, and the employment point of view in any particular area. The program as drawn up is planned to take into consideration shortages of certain raw materials in the early postwar period, particularly materials which Switzerland must import.

The general pattern of the plan is also formulated as a part of a

planned economy so that it can be accelerated in case of mass unemployment or deferred in case of a boom. Steps have been taken to make such adjustments on a district or canton (state) scale, as well as generally if the need arises. According to the Swiss Federal Railways, this type of planning facilitates the long preparatory work, including land acquisition and site preparation which must precede such a modernization plan. A part of the flexibility inherent in the plan as prepared is the use of two correlated programs for the railways, one of which is termed an "immediate" or special program, and the other the long-range, or 10-yr program. The immediate program is comprised of those needs deemed most urgent from the railway point of view, and those which will create the maximum of employment while using a minimum of materials in short supply.

Emphasis is placed in this immediate program on the extension of electrification to ease the critical coal position, and the modernization of existing locomotives and rolling stock, rather than on the construction of new units, because of the difficulty in importing essential parts and materials.

Table I sets out the allocations of expenditures between the different types of work under both the immediate and 10-yr programs.

Electrification: The electrification program is unique in that it is deemed one of the most urgent items, and 35 of a total of 51 million francs allotted for the purpose are scheduled to be used in the immediate period. It is pro-

posed to convert a further 546 km of line, of which 276 km will be in the immediate program and 314 in the remainder of the program. When this is completed, all of the 2900 route-km of the Swiss Federal Railways will be converted to electrical operation.

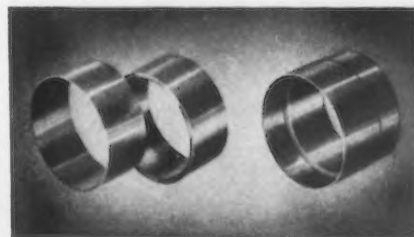
It is pointed out in the program that unlike the earlier electrification programs, the conversion of none of the lines in question, due to the fact that they are single track lines of light traffic, can be justified on a purely financial standpoint. Current feeling in Switzerland, however, is that the electrification ought not to be assessed on monetary grounds alone. Also taken into consideration are problems of coal conservation, and the attendant operating problems of today when it has become necessary to burn wood in many locomotives.

The electrification has been deemed so urgent that early in 1944 authority was given for the conversion in the years 1944-46 of the 276 km in the immediate program, using substitute materials developed during the early war years. Thus, wooden poles, set in iron or concrete sockets, were to be used instead of steel poles to carry the overhead gear; steel wire coated with copper was to be used for the overhead contact line on open sections, and iron wire for sidings; for the feeder cables aluminum was to be substituted for copper; and certain spare equipment was to be loaned from lines already electrified.

This work has been carried on so rapidly during the past two years that of the seven lines involved in the special program,

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THE IRON AGE, March 7, 1946—173

TABLE I

Nature of Work	Proposed Expenditure ^a (Millions Francs)	
	Immediate Program	10-Yr. Program
Locomotives and rolling stock	90	300
Widening of existing lines	47 F ¹	246
Construction of new lines	12	32
Station construction and signalling	21	60
Stations and other buildings	5	15
Bridge construction	7	27
Abolition of level crossings	3	26
Telegraph and telephones	35	3
Electrification	35	51
TOTAL	220*	760

^a A further 10 million francs is set aside for other urgent works.

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NEWS OF INDUSTRY

only one currently remains to be completed. Work has already been authorized for the remaining 314 route-km scheduled under the program.

When the open line work is completed, it is now planned to complete the electrical operation of the whole system by installing overhead wiring for the yards and depots where steam locomotives are now used. During the transition years this use of steam locomotives has been common, and to use existing equipment as much as possible all switching has been done by steam power. The eventual plan is for all such activities to be converted, thus reducing the considerable duplicative overhead charges. In recent years, as fewer steam engines have been in use, these charges have become excessive.

In anticipation of the increased power consumption due to the increased lineage, the railway organization, in connection with the North-East Hydro-Electric Co. has under construction a new hydro-electric station on the Aare River near Rapperswil, Auenstein. Work is now well advanced on the construction, and additional equipment is being installed at other locations.

Locomotives and Rolling Stock: In explaining the expenditure on locomotives and rolling stock which will amount in all to 300 million francs, including 90 million francs to be spent under the immediate program, and which will constitute nearly half the total expenditure, the Swiss Federal Railways draws attention to the serious results which have arisen from their inability to make full provision for renewals in the past. Thus, on their accepted basis of a useful life of 40 yr for locomotives and passenger coaches and of 50 yr for passenger cars and baggage cars, the Swiss Federal Railways state that they should have provided some 30 million francs each year for locomotive and rolling stock renewals, made up as follows (in millions of francs)

Locomotives	9.5
Passenger coaches	12.0
Passenger-train vans and goods wagons	6.5
Other vehicles	2.0

In practice, they had only been able to allocate from 10-12 million francs per year and, in conse-

quence, much of the rolling stock was fast becoming seriously over-age. The average of passenger coaches was already 28 yr compared with the target of 20 yr, while that of wagons was 32 yr as compared with a target figure of 25 year. Taking the stock as a whole, the average age was seven to 8 yr beyond that provided for.

In addition, the new high standard of comfort, set by the few all-steel lightweight coaches put in service shortly before the war, has made the public realize how out of date much of the stock is in comparison with what is now possible. The amount of coaches due for renewal is such that, even if all the work scheduled under the 10-yr program were carried out to time, at the end of the period no less than 1700 coaches, then 40-50 yr old, would still be in service; at the moment, some 4000 passenger coaches and baggage cars, whose age is beyond that schedule, are still in use, and some of these vehicles are as much as 60 yr old. To bring the average age of the coaching stock down to the target figure of 20 yr, it would be necessary to build 100 vehicles in a year for 30 yr, an impracticable measure for the reasons furnished later.

In regard to freight cars, large numbers have been ordered during the war years, but even if, as is anticipated, traffic falls considerably as the abnormal conditions of the war years recede, it will still be necessary to accelerate further the putting into service of new cars in order to make it possible to withdraw from traffic the large number of over-age units still in service.

The requirements of locomotives will depend largely on the rate at which it proves feasible to carry out the electrification work and on the actual life of electric locomotives now in service. Sufficient experience does not appear to be available to permit of final conclusions being drawn on this subject.

The Swiss Federal Railways realize that the objects set out can, for some years, be little more than ultimate aims, as in the immediate postwar years the shortage of some materials is likely to be a serious handicap. In addition, the number of workshops (both railway and private industry)

Fast Tough



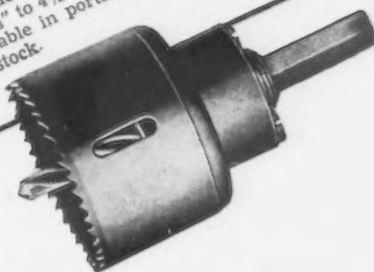
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equipped for the construction of all-steel lightweight coaching stock is limited, and it is considered undesirable to increase permanently the capacity of these shops at a high capital cost, in order to cope with what might well be only a temporary demand. This bottleneck will, to some extent, be overcome by sub-contracting to firms not normally engaged in rolling stock production and using the permanent shops more for assembly purposes.

As a first step, 90 million francs are to be spent under the immediate program. Of this sum, 40 million francs will be allocated to the purchase of electric locomotives for high-speed lightweight trains and of electric switching locomotives, and to the modernization of the earlier electric locomotives. The other 50 million francs will be devoted to the purchase of all-steel lightweight passenger coaches and other cars.

The construction of new locomotives, in particular, will depend on the ability to import from

abroad axles, tires, springs and special steels and copper. If such imports are unobtainable or only available in very small quantities, it is proposed, as a first step, to rebuild the older electric locomotives put in service when the St. Gothard line was electrified (1920-1924). The mechanical parts of these engines are still good, but the motors are both worn and somewhat out of date. This work can be done without any imports from abroad.

Widening of Existing Lines: The Swiss Federal Railways point out that, in spite of the large expenditure on the doubling of single-track lines since the formation of the undertaking in 1901-1902—namely, some 240 million francs—the proportion of double-track in 1943 was only 38 pct, and that all the principal main lines still contain single-track sections. They make it clear that this deficiency has been due to the very high cost of doubling many of the sections concerned, owing to the difficult nature of the country and to the

heavy engineering works involved, which is the very reason why only a single-track line was built in the first instance.

In all, it is proposed to double a further 404 km of line, increasing the total length of double-track line from 1100 km to 1500 km or from 38 pct to 52 pct of the route-length of the system, i.e. 2900 km. The work is estimated to cost 246 million francs, or some 600,000 francs per route-km; of the total expenditure some 47 million francs, or about one-fifth, is scheduled under the immediate program. While the cost per route-km seems high, it is pointed out that the cost of a new main road works out at 450,000-675,000 francs per km in easy country, and decidedly more in mountainous country. The new program of doubling is much more ambitious than that in force before the war, when only 6 million francs per annum were allocated for this work. At this rate, the new program would require no less than 40 yr to be completed. The complete doubling program comprises 35 separate projects, of which 22 are included in the immediate program, even though when the program was prepared the possibility of completing these for some years appeared remote owing to the difficulty of obtaining rails.

These widening schemes are considered as being of particular value in creating employment owing to the large amount of labor, much of it unskilled, directly absorbed, and to the requirements for cement, stone, ballast, which, together with the construction of bridges and tunnels, will provide considerable employment in a number of industries and localities. It is feared that the completion of the widenings may be delayed by the impossibility of obtaining rails, which must be purchased from abroad. If this proves to be the case, work on the formation and engineering works will be carried as far as possible, the rail laying being left until later.

Bridge Reconstruction: There are a number of steel bridges throughout the system which date from the opening of the various lines and which will not, for long, stand the passage at speed of modern electric locomotives. Some of these bridges have already been strengthened or rebuilt, and

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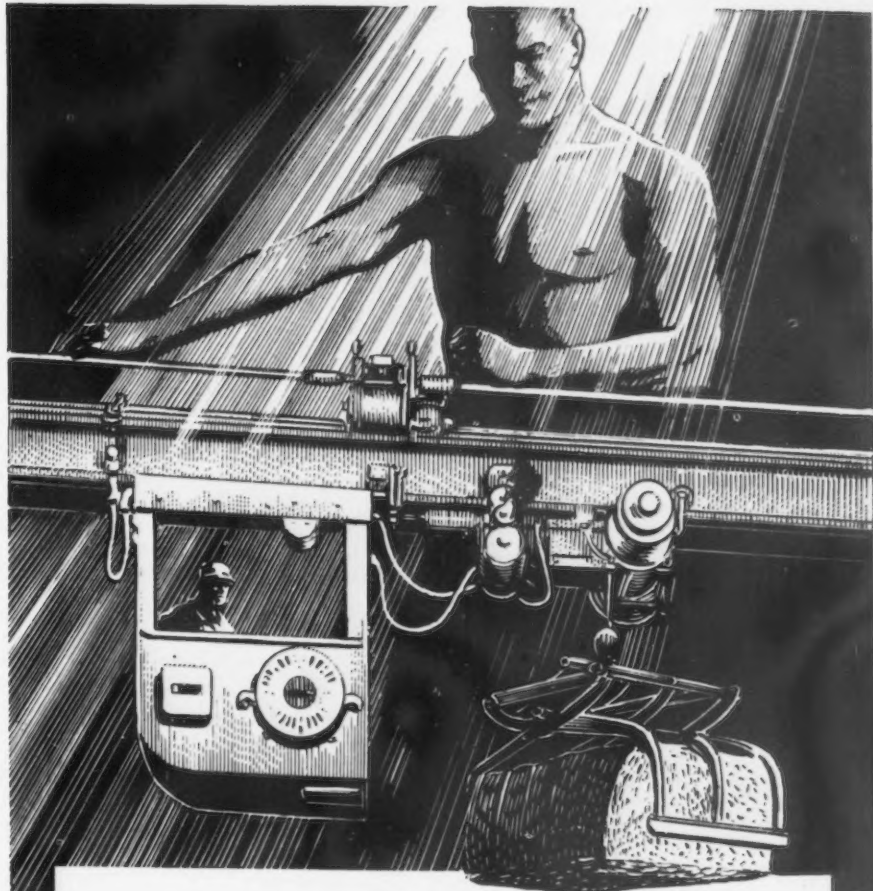
Manchester, New Hampshire

others, on lines to be electrified, will have to be done in conjunction with the electrification. On the St. Gothard line, a further 18 steel bridges are to be replaced by masonry structures under the immediate program. The progress of this work will depend to some extent on the traffic density and the extent to which the engineers will be allowed possession of track and to impose speed restrictions. As has already been done with success, some of the former steel bridges will be converted into arched masonry structures, using the old steelwork as reinforcing material; this causes less interruption to traffic.

The bridge reconstruction work will be largely undertaken by contractors, and this fact, too, should help the employment situation. A total expenditure of 27 million francs is provided for, of which 7 million are in the immediate program.

Telegraph And Telephone Systems: Expenditure on this account is small, amounting in all to only 3 million francs, and, owing to the difficulties in obtaining materials, none of the schemes can be included in the immediate program. Provision is made for the completion and improvement of the railways' own telegraph and telephone network; for the installation of numbers of teleprinters; and for the installation of loudspeakers at all the principal stations.

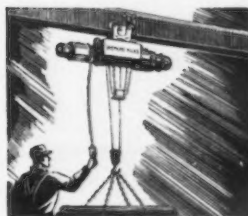
Financial Arrangements: Insofar as finance is concerned, the works will be divided into two categories—firstly, ordinary works and secondly extra-ordinary works. The ordinary works are those which the Swiss Federal Railways regard as necessary and economically justifiable from the purely railway point of view and for which they are prepared to pay, in full, out of their own funds. For such works they are prepared to allocate 25 million francs per year for each of the 10 yr, charging this amount partly to capital and partly to renewals. In the case of the extra-ordinary works, the railways will contribute up to 40 pct of the cost, the other 60 pct being charged to public funds, i.e. the Federal Government, the Cantons, the Communes or to the Unemployment Relief Fund, according to circumstances.



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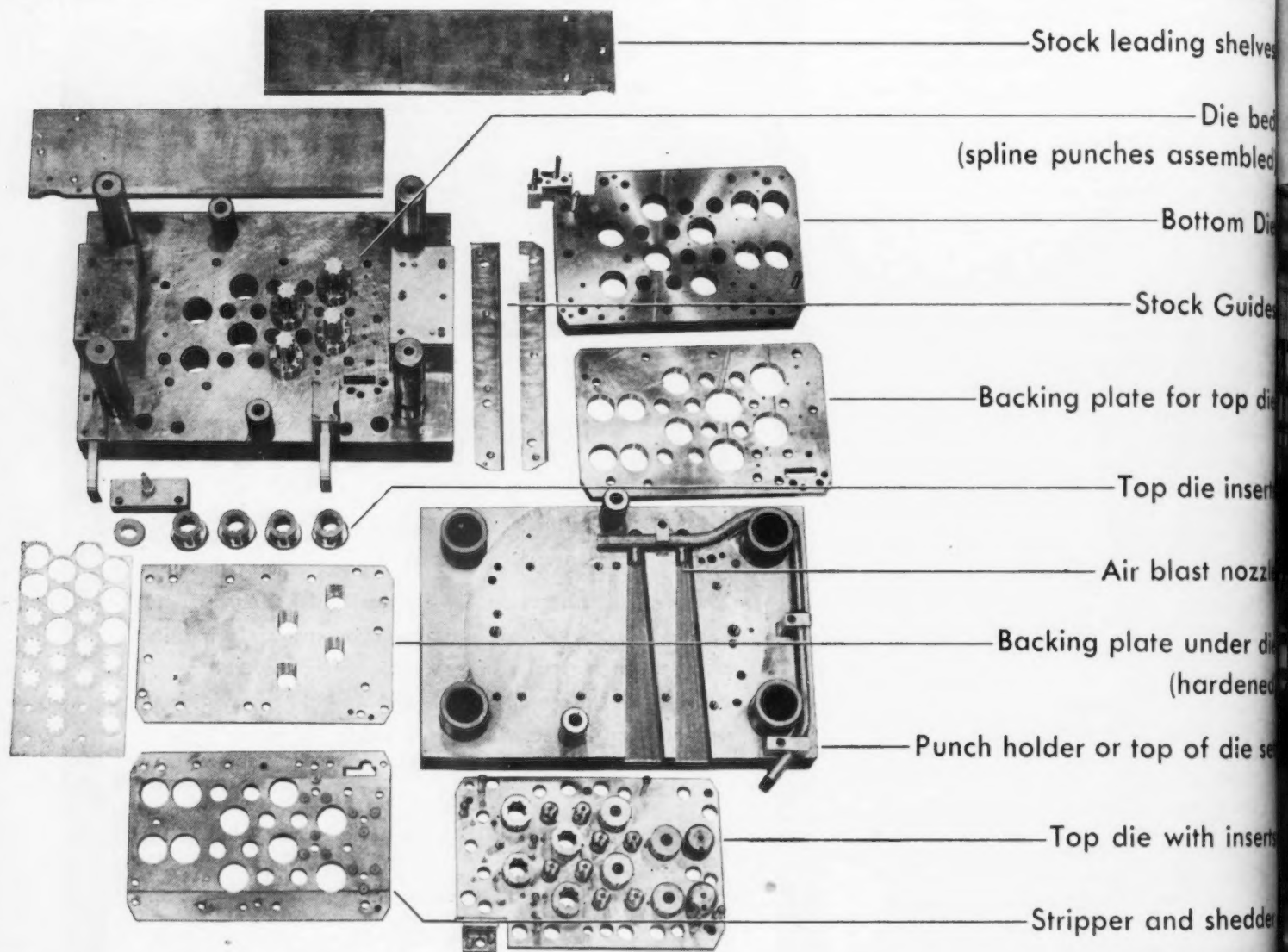
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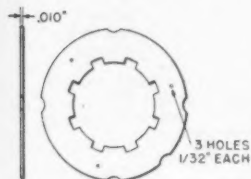
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